

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-271979

(43)Date of publication of application : 18.10.1996

(51)Int.Cl.

G03B 21/10

G03B 21/62

H04N 5/74

(21)Application number : 07-150367

(71)Applicant : HITACHI LTD

(22)Date of filing : 16.06.1995

(72)Inventor : OISHI SATORU  
YOSHIKAWA HIROKI  
TANIDE HIDEO  
YOSHIDA TAKAHIKO  
MORI SHIGERU  
OSAWA ATSUO  
HIRATA KOJI  
MATSUDA YUTAKA

(30)Priority

Priority number : 07 12826 Priority date : 30.01.1995 Priority country : JP

**(54) BACK PROJECTION TYPE MULTI-SCREEN DISPLAY DEVICE AND DISPLAY SYSTEM USING IT**

(57)Abstract:

**PURPOSE:** To provide a dome type display device which is bright and high definition and which is constituted so that a projection device does not become the obstacle of a viewer by using a trapezoid or a polygon having five or more angles for the shape of the transmission type screen of proper one out of respective back projection type display devices.

**CONSTITUTION:** Four uppermost-stage back projection type display devices of the back projection type multi-screen display device have the shape of the trapezoidal transmission type screen and two lower-stage display devices have the shape of the rectangular transmission type screen. Then, video light emitted from the projection devices of the respective back projection type display devices is transmitted through the transmission type screens 1 and 5 and it arrives at the viewer 9. When the viewer 9 views the screen from the center, the visual field angle in a horizontal direction becomes  $120^\circ$  and that in a vertical direction becomes  $10^\circ$  in a lower direction and  $50^\circ$  in an upper direction. Thus, when all of the adjacent videos are added, a picture which can give sufficient presence to the viewer 9 is formed.



\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## PRIOR ART

---

[ Description of the Prior Art ] In display systems, such as training devices, a game device of recent years and an amusement park, a driving simulator, flight simulator, providing those who do view \*\* with the false space which feeling which enters into an image - - a feeling of presence - - producing consciousness - - the quality of play, or training of training - - it is required degree should be raised. The above-mentioned display system gives a matter [ those who do view \*\* ] to make it perceive to various feelings, such as visual an acoustic sense, with an image, a sound, a feeling of acceleration, etc., example. In this case, although there is individual difference, an image with highest consciousness effect with an image and an angle of visibility large for purpose more can give more powerful presence.

[ 0003 ] The front projection type dome shape display device which projects picture on the reflection type screen of the formal dome shape which covers covers those who do view \*\* as a device which acquires an image with this large angle of visibility from the view \*\* person side existed.

[ 0004 drawing 3 ] is a schematic diagram of the cross section of a front projection type dome shape display device. In the figure, it is reflected by reflection type screen 91 and the image projected from the front projection arrangement 90 reaches the view \*\* person 9 who sat on the seat 23 for view. The front projection arrangement 90 is composition which expands the picture displayed on the projected type cathode-ray tube as a small picture source of release, a liquid crystal display or a film, etc. with a fish eye type projection

and projects it on the reflection type screen 91 of a dome shape. As the first projection arrangement 90 is shown in drawing 3.0 it is not only located in a viewer's overhead location, but the composition installed in the side, is considered.

[0005] The picture displayed on a projected type cathode-ray tube, etc., as a small picture source of release as an on the other hand simple system, it expands with a projection lens, display devices, such as projection television projected on a transmission type screen, consider it as the system which improvement in image quality is remarkable and can support screen simply in recent years, and spread is progressing to business use.

[0006] In this back projection display device, When using a projected cathode-ray tube as a picture source of release, in order to make a uniform transmission type screen bright enough and to maintain the definition of a picture, General ly the projected type cathode-ray tube and the projection were conventional ly combined about the three primary colors of R, G, respectively, and the method which performs trichromatic composition on a transmission type screen was adopted.

[0007] Drawing 3.1 is a cross-sectional view showing the optical system of a common back projection display device. As shown in the figure, the projected type cathode-ray tube of about 5 inches of vertical angle is tilted to 8 times - about 20 times with the projection lens 60. Centering on G type cathode-ray tube 61, in-line arrangement of B projection type cathode-ray tube 63 and the R projection type cathode-ray tube 62 is carried out at a wide at right angle and left, and arrangement of a projected type cathode-ray tube compounding image lights on the transmission type screen 65. Each projected type cathode-ray tube and each projection lens are connected by the bracket

[0008] Drawing 3.2 is a perspective view showing the important section of the transmission type screen by the conventional technology used for such a projection display device. As shown in the figure, the conventional transmission type screen is two-sheet composition which consists of Fresnel lens sheet 51 and the lenticular lens sheet 70. The light incidence face 52 of Fresnel lens sheet 51 at surface, and the Fresnel convex lens is formed in the light emitting face 53. The light flux of the image light which enters from the light incidence is established so that it may become a parallel pencil from the light emitting

surface 53 mostly and may be emitted, and the Fresnel convex lens of the light emitting surface 53 of Fresnel lens sheet 50 has an effect which makes uniform the luminosity of the whole screen of a transmission type screen.

[ 0009] drawing 33 is a cross-sectional view showing the important section of the lenticular lens sheet 70. As shown in the figure drawing 32 the lenticular lens sheet 70 the shape of the light incidence face 71, The longwise lenticular lens which makes a screen perpendicular direction a longitudinal direction, The longwise lenticular lens which makes the shape which carried out multiple arrays succeeding the screen picture horizontal direction and in which the shape of the light emitting surface 72 makes a screen perpendicular direction a longitudinal direction, The shape which continued by turns and carried out the multiple arrays of the light absorption band 73 of the limited width which makes screen perpendicular direction a longitudinal direction is made. The later cross sectional shape of the lenticular lens of the light incidence face 71 is carrying out face shape near an ellipse, and the shape and characteristic are stated to J P, S 58 - 59 4 36, A in detail.

[ 0010] When view of the image of a display device is carried out in the bright interior of a room, an indoor light turns into outdoor daylight and may be reflected by the screen, and may overlap with image lights, it may be visible, and the phenomenon an image is hard coming to see may occur, but. The operation with the above-mentioned lenticular lens sheet has reduction of outdoor daylight reflection of a display device.

[ 0011] As shown drawing 33 when the incident light 74 refracted with the longwise lenticular lens passes through the light emitting surface 72, it can be collected within the limits of the fixed width of a light emitting surface. And outdoor daylight reflection of a screen can be substantially reduced by painting the position which light does not emit in black paints, and considering it as the light absorption band 73. In the conventional lenticular lens sheet, if the area ratio of the light absorption band in a light emitting surface is made about 50%, since outdoor daylight reflection of a light absorption band is very small, it can be regarded as about 0 and the average reflectance of the outdoor daylight in a screen surface will be reduced about 50% as compared with the case where there is no light absorption band. Therefore, reflectivity is reduced by half even when there is the same outdoor daylight.

[0012] In this back projection display device, in order to obtain higher presence, a majority of two or more back projection display devices are made to connect with length and a transverse direction, and the back projection type multiscreen display device which acquires a big picture is proposed. Since the size of the screen of each back projection display device can provide comparatively easily big screens, such as 200 inches of vertical angles, by considering it as such a multiscreen system with about 40 inches of vertical angles, The magnifying power of the projected type cathode-ray tube by a projection lens is about eight, ends, and becomes advantageous in respect of a luminosity, a definition, etc.

[0013] However, in order to provide a picture with presence which enters into a picture to a viewer person, even if it is a big screen, a flat surface will not be enough as a screen surface, and the display device which provides a picture in the form which encloses a viewer person will be needed.

[0014] Therefore, the angle was horizontally given to the conventional back projection type multiscreen display device for the screen of each other to combine, and the art of incurvating the whole screen horizontally existed in it.

[0015] Drawing 3 4 is a perspective view showing one example of the conventional back projection type multiscreen display device which curved horizontally. In the figure, the back projection type multiscreen display device is constituted as a thing which made three steps of back projection display devices [ four steps of ] adjoin a lengthwise direction mutually horizontally, respectively. Each back projection display device has an angle of 30 degrees mutually horizontally, and is put together. Here, the ratio of the length of the transmission type screen of each back projection type display in every direction is 4: 3, and screen size is 40 inches of vertical angles. In drawing 3 4 3 has attached the screen buck 2 which is a unit buck of each back projection display device having the projection arrangement 4, and held the rectangle screen ( transmission type screen ) 1 in the front face. 8 is buck which carries and holds a multiscreen display device.

[0016] Drawing 3 5 is the cross-sectional view which looked at the conventional back projection type multiscreen display device of drawing 3 4 from the top. As shown in the figure, when it is in the position in which the viewer person 9 was m away from the screen, a horizontal angle of visibility will be about 120 degrees, and horizontally sufficient presence is obtained.

---

[Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## TECHNICAL FIELD

---

[ Industrial Application] Two or more back projection display devices are used this invention as a display of an image, Two or more of these back projection display devices are made to adjoin mutually, and a feeling of presence is related with the back projection type multiscreen display device which acquires a big picture, and those who do view \*\* of the image using it at a suitable display system to produce the existing consciousness.

It is related with the back projection type multiscreen display device which incorporated the screen surface of the above-mentioned back projection type multiscreen display device to three-dimensional curved surface shape especially and the display system using it.

---

[ Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawing s, any words are not translated.

---

## TECHNICAL PROBLEM

---

[ Problem(s) to be Solved by the Invention] By the way, in the above mentioned front projection type dome shape display device drawing 3.0 the high image contrast presence was not able to be provided for the Reason mainly explained below.

[ 0018 ] Since a projection arrangement was firstly located in the same side as the viewer's eye to a screen as the 1st problem, in view of an image, the projection arrangement entered into the view and the viewer's eye was not able to get the feeling of devotion to a perfect image. When especially the diameter of a dome was 4 m or less, it was difficult for a projection arrangement to become obstructive and for a viewer's eye to reach the optimal view apparent position.

[ 0019 ] Since it was necessary to irradiate with a large area with one projection arrangement as the 2nd problem, the magnifying power of the picture by a projection lens became large, and only the dark image was able to be provided. For example, if screen size of a picture source is made into 5 inches of vertical angles, the magnifying power at the time of projecting on the screen of 11 inches of vertical angles will be 2.4 times, and \*\*\*\*\* will serve as the abbreviation of the luminosity of a video source. Although it is possible to increase luminosity by increasing the number of projection arrangements, the problem which the space and position restrictions which a projection arrangement takes become still larger in that case occurs.

[ 0020 ] When the magnifying power of the picture by a projection lens further became large as the 3rd problem, the problem that the definition of a picture was also generated.



[0021] On the other hand, there is no problem of the luminosity and definition which a front projection type dome shape display device has in the conventional back projection type multiscreen display device. In a projection arrangement located in the opposite hand of a screen to a viewer's person in the case of a back projection display device, Even when the number of projection arrangement is increased, in order that there may be no problems, like restriction of a viewer's apparent position and a projection arrangement go into a viewer, it is easy to increase the number of projection arrangements and to consider it as a multiscreen system. For example, when the back projection display device of vertical angles is used, The magnifying power which expands the of 5 inches of vertical angles of a projected type cathode-ray tube to 40 inches of vertical angles is eight, the fall of a luminosity will also be  $1/64$  and each back projection display device can secure a sufficient luminosity and definition.

[0022] However, although the conventional back projection type multiscreen display device can incur a screen to either a transverse direction or a longitudinal direction and can extend an angle of visibility, it was impossible to incurvated both directions and to have extended the angle of visibility of both directions in every direction.

[0023] For example, in the back projection type multiscreen display device in said drawing 3 and drawing 3, sufficient angle of visibility for a sliding direction is not obtained.

[0024] Drawing 3 is a drawing of longitudinal section of said conventional back projection type multiscreen display device. As shown in the figure, when carried out from the position the viewer's person 9 was [the position] 1.5 m from the screen surface, an above angle of visibility will be about 45 degrees. However, since the problem to which a viewer's person's degree of view angle to the screen method line direction 80 will be 45 degrees, and distort the picture of appearance becomes large occurs in a screen upper bed, an angle of visibility above [substantial] becomes still smaller.

[0025] Since a back projection display device had a weight of 50 to [percentage], when the number to accumulate increased, the difficulty of the assembly accompanied by it.

[0026] There is a color shift from which a color changes with the degrees of viewing angle as a problem which a back projection display device has. Since

angle which enters into the transmission type screen of each image lights of R, G, and B is different in the case of the system which uses three projection lenses, the degree of viewing angle to which the light becomes strong according to R, G, and B exists also in the image lights to emit independently. Change of the color accompanying change of this degree of viewing angle is called a color shift. As shown in said [drawing 3.1](#) in the back projection display device which uses the conventional projected type cathode-ray tube, the projection lens C and B meets a transmission type screen with the angle of about  $10^\circ$  degrees, respectively. This angle is called angles of convergence. R, G, and B which are emitted from a transmission type screen here - - since the difference of the degree of viewing angle to which another image lights become the strongest is amended by the transmission type screen, it becomes about 50% of angles of convergence. However, an about  $5^\circ$  - degree difference is still among the of viewing angle of image lights which become the strongest according to R, G, and B. For this reason, when a screen is incurred and it combines, there is problem from which especially a screen joins together and a color changes rapidly in a part.

[ 0027 ] [Drawing 3.7](#) is an expansion schematic diagram in the conventional back projection type multiscreen display device in which a screen's joining together showing the cross section of a part. In the figure, the screen 65 (rectangle 1) is together put with the angle of  $30^\circ$  degrees. Since a screen joins together  $15^\circ$  degrees of the viewing person's  $9^\circ$  degrees 81 of viewing angle screen method line direction 80 differ on a screen on either side in a part as shown in the figure, change of the degree of viewing angle turns into change of a color, and the problem from which the color of a screen on either side differs occurs.

[ 0028 ] When incurring a screen, image lights enter from the screen which and the problem which worsens contrast of a picture occurs.

[ 0029 ] [Drawing 3.8](#) is a schematic diagram showing one example of the vertical section of the incurred back projection type multiscreen display device. Since the phenomenon in which it is reflected in other screen surfaces, and the image lights emitted from the screen surface turn into the catoptric light 82, and turn the viewing person occurs when incurring a screen as shown in the figure, contrast of a picture deteriorates.

[0030]The place which this invention was made in view of the problem which the conventional technology mentioned above has, and is made into the purpose, Are the display system which realizes false space which can give feeling which enters into an image at those who do view \*\* in providing, and to eye others. . The problem of a conventional front projection type dome shape display device can be solved. It is bright, and is highly minute, and a projection arrangement is in providing the dome shape display device which does not become a view \*\* person's obstacle, It is in providing the back projection type multiscreen display device which gives presence further to the image of the conventional back projection type multiscreen display device, and can cover all a view \*\* person's views.

[0031]In realizing the back projection type multiscreen display device of a dome shape, the place made into other purposes of this invention is lightweight, and there is in providing the simple back projection display device of an assembly.

[0032]The place made into the purpose of further others of this invention, It is in improving change of a color [ in / it joins together and / a part ] and the contrast of a picture which are the problems of the incurvated conventional back projection type multiscreen display device, and also providing a high definition back projection type multiscreen display device.

---

[Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## CLAIMS

---

[ Claim( s) ]

[ Claim 1 ] In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen two or more, an aggregate of a screen surface of transmission type screen of two or more of said back projection display device. A back projection type multiscreen display device being a concave screen surface of shape of the about 3 - dimensional curved surface which sees from the inside of said back projection type multiscreen display device, and turns into a concave surface.

[ Claim 2 ] A back projection type multiscreen display device with which shape said concave screen surface is characterized by that it is the shape of a surface of a sphere mostly consisting of a surface of a sphere or many sides mostly in the Claim 1 description.

[ Claim 3 ] A back projection type multiscreen display device with which shape said concave screen surface is characterized by that it is the shape of a surface of an ellipsoid side mostly consisting of an ellipsoid side or many sides mostly in the Claim 1 description.

[ Claim 4 ] A back projection type multiscreen display device characterized by of said concave screen surface being the shape of a rotation curved surface which uses a constant curve as a bus line mostly, or a pseudorotation curved surface which consists of many sides and uses a constant curve as a bus line

mostly in the Claim 1 description.

[Claim 5]In a description, to any one of the Claims 1-4, at least some aggregates of a screen surface of each transmission type screen of two or more of said back projection display devices. A back projection type multiscreen display device, wherein a screen of at least one back projection display device in a back projection display device which curves to an independent 2-way and constitutes said concave screen surface makes almost planate screen shape.

[Claim 6]In a description, to any one of the Claims 1-4, at least some aggregates of a screen surface of each transmission type screen of two or more of said back projection display devices. A back projection type multiscreen display device, wherein a screen of at least one back projection display device in a back projection display device which curves to an independent 2-way and constitutes said concave screen surface makes polygonal shape other than a rectangle.

[Claim 7]A back projection type multiscreen display device characterized by at least one of the polygonal shape other than said rectangle being a trapezoid in the Claim 6 description.

[Claim 8]Inside of a back projection display device which constitutes said concave screen surface in the Claim 6 description, A back projection type multiscreen display device, wherein polygonal shape which a screen of at least one back projection display device makes is a rectangle and polygonal shape which a screen of other at least one back projection display device makes is a trapezoid.

[Claim 9]A back projection type multiscreen display device with which shape of said concave screen surface is mostly characterized by being a part of right 12th page dignity or right 12th page dignity in the Claim 2 description.

[Claim 10]A back projection type multiscreen display device with which shape of said concave screen surface is mostly characterized by being a part of right 20th page dignity or right 20th page dignity in the Claim 2 description.

[Claim 11]A back projection type multiscreen display device characterized by shape of said concave screen surface being 32nd page dignity which combines a regular pentagon and a right hexagon, or a part of this 32nd page dignity mostly in the Claim 2 description.

[Claim 12]A back projection type multiscreen display device, wherein a screen of a back projection display device which constitutes said concave screen surface in a description in any one of the Claims 1-4 makes mostly geodesic line polygonal

shape which makes a circumference two or more geodesic line arcs on a concave screen surface.

[Claim 13] A back projection type multiscreen display device characterized by at least one of said the geodesic line polygonal shape being a geodesic line quadrangle of trapezoidal shape in the Claim 12 description.

[Claim 14] Geodesic line polygonal shape which a screen of at least one back projection display device in a back projection display device which constitutes said concave screen surface makes in the Claim 12 description, A back projection type multiscreen display device, wherein it is a geodesic line quadrangle of rectangular form and geodesic line polygonal shape which a screen of other at least one back projection display device makes is a geodesic line quadrangle of trapezoidal shape.

[Claim 15] In the Claim 2 description, a screen of a back projection display device which constitutes said concave screen surface, Right ~~FIG~~ ve- cornered geodesic line pentagon shape on a concave screen surface is made mostly, A back projection type multiscreen display device, wherein shape of said concave screen surface is a part of 12th page of false positive dignity or a surface of a sphere almost near a surface of a sphere, this 12th page of false positive dignity, or a part of surface of a sphere.

[Claim 16 ] In the Claim 2 description, a screen of a back projection display device which constitutes said concave screen surface, Geodesic line triangle shape of the shape of a right triangle on a concave screen surface is made mostly, A back projection type multiscreen display device, wherein shape of said concave screen surface is a part of 20 th page of false positive dignity or a surface of a sphere almost near a surface of a sphere, this 20 th page of false positive dignity, or a part of surface of a sphere.

[Claim 17 ] In the Claim 2 description, a screen of a back projection display device which constitutes said concave screen surface, Right ~~FIG~~ ve- cornered geodesic line pentagon shape on a concave screen surface or right hex agon- like geodesic line hex agon shape is made mostly, A back projection type multiscreen display device being a part of 32nd page of false dignity or a surface of a sphere with shape of said concave screen surface almost near a surface of a sphere which combines geodesic line pentagon shape and geodesic line hex agon shape, 32nd page of false dignity, or a part of surface of a sphere.

[Claim 18] In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, Are a concave screen surface of shape of the about 3-dimensional curved surface which sees from the view \*\* side of said back projection type multiscreen display device, and turns into a concave surface, and a visual field range seen from a view apparent position of this concave screen surface is based on a front direction, A back projection type multiscreen display device exceeding 60 degree in any direction of the right-and-left upper and lower sides.

[Claim 19] In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, Are a concave screen surface of shape of the about 3-dimensional curved surface which sees from the view \*\* side of said back projection type multiscreen display device, and turns into a concave surface, and. A back projection type multiscreen display device constituting inside of space formed in this concave screen surface so that passing through may be possible.

[Claim 20] A back projection type multiscreen display device allocating view \*\*\*\* or a passage which consists of a caudad almost transparent material of a view apparent position in Claim 18 or 19 descriptions.

[Claim 21] A back projection type multiscreen display device characterized by width of said view \*\*\*\* or a passage being 2 m or less in 0.5 m or more in the Claim 20 description.

[Claim 22] In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, A back projection type multi-vision display device which is a concave screen surface of shape of the about 3-dimensional curved surface which sees from the

view \*\* side of said back projection type multiscreen display device, and turns into a concave surface, and is characterized by establishing a passage to a view apparent position in an opposite direction of a subjectivity visual direction from a view apparent position.

[Claim 23]In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, A back projection type multi-vision display device which is a concave screen surface of shape of the about 3-dimensional curved surface which sees from the view \*\* side of said back projection type multiscreen display device, and turns into a concave surface, and is characterized by providing a passage to a view apparent position caudad rather than this view apparent position.

[Claim 24]A back projection type multi-vision display device forming a back projection display device of working for forming an entrance in a passage to said view apparent position in Claim 22 or 23 descriptions.


[Claim 25]A back projection type multiscreen display device having a seat for view \*\* or view \*\*\*\* which moves between the exterior of a back projection type multiscreen display device, and an inside in a passage top to said view apparent position in Claim 22 or 23 descriptions.

[Claim 26]In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, Are a concave screen surface of shape of the about 3-dimensional curved surface which sees from the view \*\* side of said back projection type multiscreen display device, and turns into a concave surface, and receipts and payments to a view apparent position are faced, A back projection type multiscreen display device constituting so that it can carry out movable [ of said whole back projection type multiscreen display device or the part ].

[Claim 27]In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection



arrangement provided with a video source and a projection lens, and a transmission type screen two or more, At least some aggregates of a screen surface of each transmission type screen of two or more of said back projection display devices. Curve to an independent 2-way and an aggregate of a screen surface of said transmission type screen, . See from the view \*\* side of said back projection type multiscreen display device, and become a concave surface. It is considered as a concave screen surface of shape of an about 3-dimensional curved surface, and a screen buck of a back projection display device, A back projection type multiscreen display device making multi-truncated pyramid shape in the air where area becomes small gradually toward a screen mounting part of the front face, from the inner side.

[Claim 28]In the Claim 27 description, a screen buck of said back projection display device, A back projection type multiscreen display device having equipped with a screen unit removable from the projection arrangement side, and having composition which  x es a screen unit by a screen unit holddown member.

[Claim 29 ]In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, . See from the view \*\* side of said back projection type multiscreen display device, and become a concave surface. A back projection type multiscreen display device, wherein it is considered as a concave screen surface of shape of an about 3-dimensional curved surface and a screen buck part and a projection arrangement supporter make the supporting structure almost independent of mutual substantially.

[Claim 30 ]A back projection type multiscreen display device, wherein a projection unit of each back projection display device is mutually connected in the Claim 29 description.

[Claim 31 ]A back projection type multiscreen display device, wherein a screen buck of a back projection display device is mutually connected in the Claim 30 description.

[Claim 32]In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection

arrangement provided with a video source and a projection lens, and a transmission type screen two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, It is considered as a concave screen surface of shape of the about 3-dimensional curved surface which sees from the view \*\* side of said back projection type multiscreen display device, and turns into a concave surface, and each back projection display device, A back projection type multiscreen display device characterized by arranging a video source of R, G, and B at a single tier, and coming to combine a projection lens with each video source, respectively.

[Claim 33]In the Claim 32 description, a screen unit of each of said back projection display device, Provide an Fresnel lens sheet and a lenticular lens sheet at least, and a light incidence face of a lenticular lens sheet, A lenticular lens which makes a longitudinal direction a direction almost vertical to an arrangement direction of a video source of R, G, and B, Make shape arranged to an arrangement direction of a video source of R, G, and B, and a light emitting surface of a lenticular lens sheet, A back projection type multiscreen display device making shape where arranged a lenticular lens which counters a lenticular lens of a light incidence face mostly, and a light absorption band of limited width was further arranged between contiguity lenticular lenses.

[Claim 34]In a back projection type multiscreen display device constituted combining a back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, It is considered as a concave screen surface of shape of the about 3-dimensional curved surface which sees from the view \*\* side of said back projection type multiscreen display device, and turns into a concave surface, and each back projection display device, A back projection type multiscreen display device characterized by being arranged so that a photograph center of each video source of R, G, and B may serve as a triangular vertex, respectively, and coming to combine a projection lens with each video source, respectively.

[Claim 35]In the Claim 34 description, a coupler which combines each video source and each projection lens, A back projection type multiscreen display device, wherein one piece is allocated as a common coupler for every back

projection display device, it is ~~is~~ x ed to a common cou pler and all of a video sou and each projection lens of R, G, and B are h eld.

[ C laim 3 6 ] I n th e C laim 3 4 description, a screen u nit of each of said b a projection display device, P rovide an F resnel lens sh eet and a micro lens sh eet a least, and a lig h t incidence f ace of a micro lens sh eet, Mak e sh ape wh ere tw more micro convex lenses were arrang ed, and a lig h t emitting su rf ace of a r lens sh eet, A b ack projection type mu ltiscreen display device mak ing sh ape w arrang ed a micro convex lens wh ich cou nters a micro convex lens of a lig h t incidence f ace mostly, and a lig h t ab sorption b and of limited lattice- lik e widt arrang ed b etw een micro convex lenses wh ich adjoin f u rth er.

[ C laim 3 7 ] A b ack projection type mu ltiscreen display device, wh erein a mic of a lig h t incidence f ace and a lig h t emitting su rf ace of said micro lens sh th e asph erical su rf ace sh ape almost near an ellipse or an ellipse as sectional sh ape in th e C laim 3 6 description.

[ C laim 3 8 ] A projection arrang ement provided with a video sou rce and a pro lens.

A transmission type screen.

A re th e ab ove th e b ack projection type mu lti- vision display device wh ich it l and an ag g reg ate of a screen su rf ace of each transmission type screen of more of said b ack projection display devices, I n order to f orm an entrance in a passag e to a view apparent position wh ich sees f rom th e view \* \* side of sa projection type mu ltiscreen display device, and serves as a concave su rf ace and wh ich is made into a concave screen su rf ace of sh ape of an ab ou t 3 - dim cu rved su rf ace, and carries ou t view \* \* of th e imag e, O ne copy or all of a projection display device w as made into work ing .

[ C laim 3 9 ] A projection arrang ement provided with a video sou rce and a pro lens.

A transmission type screen.

A re th e ab ove th e b ack projection type mu lti- vision display device wh ich it l and an ag g reg ate of a screen su rf ace of each transmission type screen of more of said b ack projection display devices, A passag e to a view apparent position wh ich sees f rom th e view \* \* side of said b ack projection type mu display device, and serves as a concave su rf ace and wh ich is made into a conce

screen surface of shape of an about 3-dimensional curved surface, and carries out view \*\* of the image goes up and down or slides.

[Claim 40]In a back projection type multiscreen display device characterized by comprising the following constituted combining a back projection display device two or more, An aggregate of a screen surface of each transmission type screen of two or more of said back projection display devices, . See from the view \*\* side of said back projection type multiscreen display device, and become a concave surface. A back projection type multiscreen display device provided with a seat for view \*\* or view \*\*\*\* which is made into a concave screen surface of shape of an about 3-dimensional curved surface, and moves mutually between view apparent positions and the exteriors which carry out view \*\* of the image. A projection arrangement provided with a video source and a projection lens. A transmission type screen.

[Claim 41]In a display system which gives a view \*\* person an image and a feeling of acceleration at least, A back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen, To a back projection type multiscreen display device which combined more than one and was constituted. A display system characterized by giving a feeling of acceleration by disturbing one of a seat for view \*\* which displayed an image and was established in a view apparent position of said back projection type multiscreen display device, view \*\*\*\*, or passages.

[Claim 42]In a display system which gives a view \*\* person an image and a feeling of acceleration at least, A back projection display device which consists of a projection arrangement provided with a video source and a projection lens, and a transmission type screen, Display an image on a back projection type multiscreen display device which combined more than one and was constituted, and And said back projection type multiscreen display device, A display system giving a feeling of acceleration by disturbing one of a seat for view \*\* established in a view apparent position, view \*\*\*\*, or passages to one.

[Claim 43]An imitation vehicle device which imitated a vehicle controlled by view \*\* person, and the controls with which operation of this imitation vehicle device is presented, A means to correspond to conditions set to a situation of a view \*\*

person's operation peculiar to said imitation vehicle device, and to obtain the direction of imitation movement, a size of movement, etc. by a view \*\* person's operation, A field-of-view information generation means which generates an information corresponding to change of a field of view according to a view \*\* person's operation situation, A projection arrangement provided with a video source and a projection lens which carry out graphic display of the video signal from this field-of-view information generation means, A display system having at least the back projection type multiscreen display device constituted combining a back projection display device which consists of transmission type screens two or more.

[ Claim 4 4 ] A display system making it possible to use in common one or more display systems formed independently and imitation space by a means to have a means to choose imitation space for which said imitation vehicle device is made to exercise in imitation in the Claim 4 3 description, and to choose this imitation space.

[ Claim 4 5 ] A display system characterized by making it an image corresponding said imitation vehicle device of each display system exist also in said imitation space of another display system in the Claim 4 4 description.

[ Claim 4 6 ] A display system having an oscillation device which gives a view \*\* person agitation in a description any one of the Claims 4 3 - 4 5 according to change of movement by a view \*\* person's steering operation.

[ Claim 4 7 ] A display system characterized by said back projection type multiscreen display device being a device of any one description of the Claims 1 - 3 9 in a description any one of the Claims 4 1 - 4 6 .

---

[ Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## DESCRIPTION OF DRAWINGS

---

[ Brief Description of the Drawings ]

[ Drawing 1 ] is a perspective view showing the outline of the back projection multiscreen display device concerning the 1st working example of this invention.  
[ Drawing 2 ] is a front view showing the shape of the transmission type screen (rectangular screen and a trapezoidal screen) used in the 1st working example of invention.

[ Drawing 3 ] is a cross-sectional view showing the important section composition of the back projection type multiscreen display device concerning the 1st working example of this invention.

[ Drawing 4 ] is a drawing of longitudinal section showing the important section composition of the back projection type multiscreen display device concerning the 1st working example of this invention.

[ Drawing 5 ] is a perspective view showing the outline of the back projection multiscreen display device concerning the 2nd working example of this invention.

[ Drawing 6 ] is a front view showing the shape of the transmission type screen (three sorts of trapezoidal screens) used in the 2nd working example of this invention.

[ Drawing 7 ] is a cross-sectional view showing the important section composition of the back projection type multiscreen display device concerning the 2nd working example of this invention.

[ Drawing 8 ] is a drawing of longitudinal section showing the important section composition of the back projection type multiscreen display device concerning

the 2nd working example of this invention.

[Drawing 9]It is a perspective view showing the screen composition of the back projection type multiscreen display device concerning the 3rd working example of this invention.

[Drawing 10]It is a perspective view showing the screen composition of the back projection type multiscreen display device concerning the 4th working example of this invention.

[Drawing 11]It is a perspective view containing the projection arrangement of the back projection type multiscreen display device concerning the 4th working example of this invention.

[Drawing 12]It is a perspective view showing the screen composition of the back projection type multiscreen display device concerning the 5th working example of this invention.

[Drawing 13]It is drawing of longitudinal section showing the important section composition of the back projection type multiscreen display device concerning the 5th working example of this invention.

[Drawing 14]It is drawing of longitudinal section showing the screen composition of the important section of the back projection type multiscreen display device concerning the 6th working example of this invention.

[Drawing 15]In the back projection type multiscreen display device concerning the 6th working example of this invention, it is drawing of longitudinal section showing the important section composition in the state where two back projection display devices for forming an entrance were moved.

[Drawing 16]It is drawing of longitudinal section showing the important section composition of the back projection display device used for the back projection type multiscreen display device concerning the 7th working example of this invention.

[Drawing 17]It is a perspective view showing the shape of the transmission type screen (concave screen) used with the back projection display device of the back projection type multiscreen display device concerning the 7th working example of this invention.

[Drawing 18]It is a perspective view showing the screen composition of the back projection type multiscreen picture display device concerning the 7th working example of this invention.

[Drawing 19] It is a cross-sectional view showing the important section composition of the back projection type multiscreen display device concerning the 8th working example of this invention.

[Drawing 20] It is an explanatory view showing the important section composition of the back projection type multiscreen display device concerning the 9th working example of this invention.

[Drawing 21] It is a perspective view showing the important section composition of the transmission type screen used with the back projection display device of the back projection type multiscreen display device concerning the 10th working example of this invention.

[Drawing 22] It is a front view showing the important section composition of the projection arrangement used with the back projection display device of the back projection type multiscreen display device concerning the 10th working example of this invention.

[Drawing 23] It is an explanatory view showing the optical system in the projection arrangement used with the back projection display device of the back projection type multiscreen display device concerning the 10th working example of this invention.

[Drawing 24] It is a perspective view showing the important section composition of the display system concerning the 11th working example of this invention.

[Drawing 25] It is an explanatory view showing the outline of getting on and off of the view \* \* person to the imitation vehicle device of the display system concerning the 11th working example of this invention.

[Drawing 26] It is drawing of longitudinal section showing the important section composition of the back projection type multiscreen display device used with the display system concerning the 11th working example of this invention.

[Drawing 27] It is a block diagram showing the important section composition of the control system in the display system concerning the 11th working example of this invention.

[Drawing 28] It is the perspective view showing the important section composition of the display system concerning the 12th working example of this invention fractured in part.

[Drawing 29] It is drawing of longitudinal section showing the important section composition of the display system concerning the 12th working example of this



invention.

[Drawing 30] It is an explanatory view showing the outline of a conventional front projection type dome shape screen display device.

[Drawing 31] It is a cross-sectional view showing the projection optical system used with the conventional back projection display device.

[Drawing 32] It is a perspective view showing the important section composition of the transmission type screen used with the conventional back projection display device.

[Drawing 33] It is a cross-sectional view showing the important section composition of the lenticular lens sheet of the transmission type screen used with the conventional back projection display device.

[Drawing 34] It is a perspective view showing the outline of the conventional back projection type multiscreen display device.

[Drawing 35] It is a cross-sectional view showing the important section composition of the conventional back projection type multiscreen display device.

[Drawing 36] It is drawing of longitudinal section showing the important section composition of the conventional back projection type multiscreen display device.

[Drawing 37] It is an expansion schematic diagram in the conventional back projection type multiscreen display device in which a screen's joining together and showing a part.

[Drawing 38] It is important section drawing of longitudinal section in the back projection type multiscreen display device which makes the whole screen come to curve showing surface reflection with a transmission type screen.

[Description of Notations]

1 Rectangle screen ( transmission type screen)

2, 27, and 42 Screen buck

3, 7, 17, 18, 19, 28, 43, and 45 Unit buck

4 Projection arrangement

5, 11, 12, and 13 Trapezoid screen ( transmission type screen)

6, 14, 15, and 16 Trapezoid screen buck

8 Buck

9 View \* \* person

20 The floor line for view \* \*

21 The passage for view \* \*

23 and 30 Seat for view \*\*  
25 Right pentagon screen (transmission type screen)  
26 Right hexagon screen (transmission type screen)  
31 Transparent ~~Re~~ flection type screen  
35 Movab l e u nit  
4 0 C oncave screen (transmission type screen)  
4 1 and 65 Screen (transmission type screen)  
4 6 P roj ection arrangement b u ck  
4 7 The connecting frame for proj ection arrangements  
50 F resnel l ens sheet  
51 Micro l ens sheet  
52, 54, and 7 1 L ight incidence face  
53, 55, and 7 2 L ight emitting su rface  
56 and 7 3 L ight ab sorption b and  
60 P roj ection l ens  
61 G proj ection type cathode- ray tu b e  
62 R proj ection type cathode- ray tu b e  
63 B proj ection type cathode- ray tu b e  
64 B rack et  
7 0 L enticu l ar l ens sheet  
7 4 I ncident l ight  
8 0 Screen method l ine direction  
8 1 The degree of view viewing angl e  
8 2 C atoptric l ight  
9 0 F ront proj ection arrangement  
9 1 Re~~Re~~ flection type screen  
100 I mitation vehicl e device  
101 Motion RA I D O  
102 F ixed b ase  
103 O scil l ation device  
104 The door of an entrance  
105 B oarding step  
106 Step b ase  
107 L ifting device

- 110 Controls
  - 111 CPU
  - 112 Graphics board
  - 113 Back projection type multiscreen display device
  - 114 Sound board
  - 115 Loudspeaker
  - 116 Agitation control device
  - 117 Imitation space data storage
- 

[Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**CORRECTION OR AMENDMENT**

---

[ Kind of official gazette] Printing of amendment by regulation of Patent  
17 of 2

[ Section Type] The 2nd Type of the part VI of the

[ Publication date] Heisei 13 ( 2001 ) January 26 ( 2001.1.26 )

[ Publication No.] J P , 8 - 271979 , A

[ Date of Publication] Heisei 8 ( 1996 ) October 18 ( 1996.10.18 )

[ Annual volume number] Publication of patent applications 8 - 2720

[ Application number] Japanese Patent Application No. 7 - 150367

[ The 7th edition of International Patent Classification]

G03B 21/10

21/62

H04N 5/74

[ F I ]

G03B 21/10 Z

21/62

[Written Amendment]

[Filing date]Heisei 11(1999) October 15 (1999.10.15)

[Amendment 1]

[Document to be Amended]Description

[Item(s) to be Amended]Title of invention

[Method of Amendment]Change

[Proposed Amendment]

[Title of the Invention]Back projection type multiscreen display device

[Amendment 2]

[Document to be Amended]Description

[Item(s) to be Amended]Claims

[Method of Amendment]Change

[Proposed Amendment]

[Claim(s)]

[Claim 1]In a back projection type multiscreen display device which forms a large sized display combining a rear projection type display device which projects light from a video source on a back projection screen with a projection device two or more.

A back projection type multiscreen display device which combines so that it may have a portion of concave shape to which a screen of said large sized display curved a back projection screen of two or more of said rear projection type display devices in both directions of the level angle-of-visibility direction and the vertical angle-of-visibility direction, and is characterized by things.

[Claim 2]The back projection type multiscreen display device according to claim 1 in which said two or more rear projection type display devices are the composition that an edge part of said back projection screen was ~~fl~~ x ~~by~~ a unit base material.

[Claim 3]The back projection type multiscreen display device according to claim 1 with which it was made, as for said two or more rear projection type display devices, for said back projection screen to curve to an independent 2-way has a thing of a ~~fl~~ at-surface q uadranted a 2-way and at least some screens of said

large sized display cross at right angles.

[Claim 4]The back projection type multiscreen display device according to claim 1 made into polygonal shape whose screen of said large sized display, as for said two or more back projection display devices, said back projection screen has a thing of a curved surface, and makes a circumference two or more geodesic line arcs.

[Claim 5]The back projection type multiscreen display device according to claim 1, 2, 3, or 4 which is the composition for which a visual field range which looked at a screen which has a portion of said concave shape from a view apparent position exceeds 60 degrees on the basis of a front direction in any direction of the right- and- leftupper and lower sides.

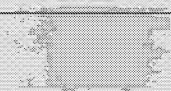
[Claim 6 ]Theback projection type multiscreen display device according to claim 1, 2, 3, or 4 whose screen which has a portion of said concave shape is the composition through which it can be passed about inside of view visual space.

[Claim 7 ]Theback projection type multiscreen display device according to claim 1, 2, 3, or 4 which is the composition that a screen which has a portion of said concave shape established a passage to a view apparent position in an opposite direction of a subjectivity visual direction.

[Claim 8 ]Theback projection type multiscreen display device according to claim 1, 2, 3, or 4 which is the composition which a screen which has a portion of said concave shape looked at a passage to a view apparent position, and was caused provided rather than an apparent position.

---

[Translation done.]



\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## DETAILED DESCRIPTION

---

[ Detailed Description of the Invention]

[ 0001]

[ Industrial Application] Two or more back projection display devices are used this invention as a display of an image. Two or more of these back projection display devices are made to adjoin mutually, and a feeling of presence is related with the back projection type multiscreen display device which acquires a big picture, and those who do view \*\* of the image using it at a suitable display system to produce the existing consciousness.

It is related with the back projection type multiscreen display device which incorporated the screen surface of the above-mentioned back projection type multiscreen display device to three-dimensional curved surface shape especially and the display system using it.

[ 0002]

[ Description of the Prior Art] In display systems, such as training devices, a game device of recent years and an amusement park, a driving simulator, flight simulator, providing those who do view \*\* with the false space which feeling which enters into an image - - a feeling of presence - - producing consciousness - - the quality of play, or training of training - - it is required degree should be raised. The above-mentioned display system gives a matter [ those who do view \*\* ] to make it perceive to various feelings, such as visual an acoustic sense, with an image, a sound, a feeling of acceleration, etc.,

example. In this case, although there is individual difference, an image with the highest consciousness effect with an image and an angle of visibility large for purpose more can give more powerful presence.

[ 0 0 0 3 ] The front projection type dome shape display device which projects picture on the reflection type screen of the formal dome shape which covers covers those who do view \* \* as a device which acquires an image with this large angle of visibility from the view \* \* person side existed.

[ 0 0 0 4 drawing 3 0 ] is a schematic diagram of the cross section of a front projection type dome shape display device. In the figure, it is reflected by reflection type screen 9 1 and the image projected from the front project arrangement 9 0 reaches the view \* \* person 9 who sat on the seat 2 3 for view. The front projection arrangement 9 0 is composition which expands the picture displayed on the projected type cathode-ray tube as a small picture source or release, a liquid crystal display or a film, etc. with a flashlight type projector and projects it on the reflection type screen 9 1 of a dome shape. As the front projection arrangement 9 0 is shown in drawing 3 0 it is not only located in a view \* \* person's overhead location, but the composition installed in the side, a step, is considered.

[ 0 0 0 5 ] The picture displayed on a projected type cathode-ray tube, a liquid display, etc. as a small picture source of release as an on the other hand more simple system, It expands with a projection lens, display devices, such as back projection television projected on a transmission type screen, consider it as the system which improvement in image quality is remarkable and can supply a big screen simply in recent years, and spread is progressing to business use.

[ 0 0 0 6 ] In this back projection display device, When using a projected type cathode-ray tube as a picture source of release, in order to make luminosity of transmission type screen bright enough and to maintain the definition of a picture, Generally the projected type cathode-ray tube and the projection lens were conventionally combined about the three primary colors of R, G, and B, respectively, and the method which performs trichromatic composition on a transmission type screen was adopted.

[ 0 0 0 7 drawing 3 ] is a cross-sectional view showing the optical system of a common back projection display device. As shown in the figure, the picture projected type cathode-ray tube of about 5 inches of vertical angles is exp



to 8 times - about 20 times with the projection lens 60. Centering on G projection type cathode-ray tube 61, in-line arrangement of B projection type cathode-ray tube 63 and the R projection type cathode-ray tube 62 is carried out at one row wide at right and left, and arrangement of a projected type cathode-ray tube is compounding image lights on the transmission type screen 65. Each projected type cathode-ray tube and each projection lens are connected by the bracket 66.

[0008] Drawing 32 is a perspective view showing the important section of the transmission type screen by the conventional technology used for such a back projection display device. As shown in the figure, the conventional transmission type screen is two-sheet composition which consists of F resnel lens sheet 50 and the lenticular lens sheet 70. The light incidence face 52 of F resnel lens sheet 50 is a flat surface, and the F resnel convex lens is formed in the light emitting surface 53. The light flux of the image light which enters from the light incidence face 52 is established so that it may become a parallel pencil from the light emitting surface 53 mostly and may be emitted, and the F resnel convex lens of the light emitting surface 53 of F resnel lens sheet 50 has an effect which makes uniform the luminosity of the whole screen of a transmission type screen.

[0009] Drawing 33 is a cross-sectional view showing the important section of the lenticular lens sheet 70. As shown in the figure and drawing 32, the lenticular lens sheet 70 the shape of the light incidence face 71, the longwise lenticular lens which makes a screen perpendicular direction a longitudinal direction, the longwise lenticular lens which makes the shape which carried out multiple arrays succeeding the screen picture horizontal direction and in which the shape of the light emitting surface 72 makes a screen perpendicular direction a longitudinal direction, the shape which continued by turns and carried out the multiple arrays of the light absorption band 73 of the limited width which makes a screen perpendicular direction a longitudinal direction is made. The lateral cross sectional shape of the lenticular lens of the light incidence face 71 is carrying out face shape near an ellipse, and the shape and characteristic are stated to JP, S 58-59 4 36, A in detail.

[0010] When the image of the image of a display device is carried out in the bright interior of a room, an indoor light turns into outdoor daylight and may be reflected by the screen, and may lap with image lights, it may be visible, and the phenomenon an image is hard coming to see may occur, but. The operation which

the above-mentioned lenticular lens sheet has reduction of outdoor daylight reflection of a display device.

[0011] As shown in Figure 3.3, when the incident light 74 is refracted with the longwise lenticular lens passes through the light emitting surface 72, it can be collected within the limits of the fixed width of a light emitting surface. And outdoor daylight reflection of a screen can be substantially reduced by painting the position which light does not emit in black paints, and considering it as the light absorption band 73. In the conventional lenticular lens sheet, if the area of the light absorption band in a light emitting surface is made about 50%, since outdoor daylight reflection of a light absorption band is very small, it can be regarded as about 0 and the average reflectance of the outdoor daylight in a screen surface will be reduced about 50% as compared with the case where there is no light absorption band. Therefore, reflectivity is reduced by half even when there is the same outdoor daylight.

[0012] In this back projection display device, in order to obtain higher probability of two or more back projection display devices are made to connect length and a transverse direction, and the back projection type multiscreen display device which acquires a big picture is proposed. Since the size of the screen of each back projection display device can provide comparatively easily big screens, such as 200 inches of vertical angles, by considering it as such a multiscreen system with about 40 inches of vertical angles, The magnifying power of the projected type cathode-ray tube by a projection lens is about eight, and becomes advantageous in respect of a luminosity, a definition, etc.

[0013] However, in order to provide a picture with presence which enters picture to a viewer, even if it is a big screen, a flat surface will not enough as a screen surface, and the display device which provides a picture in form which encloses a viewer will be needed.

[0014] Therefore, as horizontally given to the conventional back projection type multiscreen display device for the screen of each other to combine, and the art of curving the whole screen horizontally existed in it.

[0015] Figure 3.4 is a perspective view showing one example of the conventional back projection type multiscreen display device which curved horizontally. In figure, the back projection type multiscreen display device is constituted as thing which made three steps of back projection display devices [four steps

adjoin a lengthwise direction mutually horizontally, respectively. Each back projection display device has an angle of 30 degrees mutually horizontally, and is put together. Here, the ratio of the length of the transmission type screen of each back projection type display in every direction is 4:3, and screen size is 40 inches of vertical angles. In [drawing 34](#), 3 has attached the screen buck 2 which is a unit buck of each back projection display device having the projection arrangement 4, and held the rectangle screen (transmission type screen) 1 in the front face. 8 is a buck which carries and holds a multiscreen display device.

[0016][Drawing 35](#) is the cross-sectional view which looked at the conventional back projection type multiscreen display device of [drawing 34](#) from the top. As shown in the figure, when it is in the position in which the view \* \* person 9 was m away from the screen, a horizontal angle of visibility will be about 120 degrees, and horizontally sufficient presence is obtained.

[0017]

[Problem(s) to be Solved by the Invention] By the way, in the above mentioned front projection type dome shape display device of [drawing 30](#), the high image of presence was not able to be provided for the Reason mainly explained below.

[0018] Since a projection arrangement was first located in the same side as a view \* \* person to a screen as the 1st problem, in view \* \* of an image, the projection arrangement entered into the view and the view \* \* person was not able to get the feeling of devotion to a perfect image. When especially the diameter of a dome was 4 m or less, it was difficult for a projection arrangement to become obstructive and for a view \* \* person to reach the optimal view apparent position.

[0019] Since it was necessary to irradiate with a large area with one projection arrangement as the 2nd problem, the magnifying power of the picture by a projection lens became large, and only the dark image was able to be provided. For example, if screen size of a picture source is made into 5 inches of vertical angles, the magnifying power at the time of projecting on the screen of 120 inches of vertical angles will be 24 times, and \* \* \* \* \* will serve as the abbr 1/600 of the luminosity of a video source. Although it is possible to increase a luminosity by increasing the number of projection arrangements, the problem to which the space and position restrictions which a projection arrangement takes become still larger in that case occurs.

[0020] When the magnifying power of the picture by a projection lens furthermore

became large as the 3rd problem, the problem that the definition of a picture in a multi-screen system was also generated.

[0021] On the other hand, there is no problem of the luminosity and which a front projection type dome shape display device has in the back projection type multi-screen display device. A projection arrangement located in the opposite hand of a screen to a viewer \*\* person in the case of a projection display device, Even when the number of projection arrangements increased, in order that there may be no problems, like restriction of apparent position and a projection arrangement to go in to a viewer, it is necessary to increase the number of projection arrangements and to consider a multi-screen system. For example, when the back projection display device is inches of vertical angles is used, The magnifying power which exists of 5 inches of vertical angles of a projected type cathode-ray tube type vertical angles is eight, the full of a luminosity will also be 1/64 of a projection display device can secure a sufficient luminosity.

[0022] However, although the conventional back projection type projection display device can incur a screen to either a transverse direction or a longitudinal direction and can extend an angle of visibility, it was not incur both directions and to have extended the angle of visibility in both directions in every direction.

[0023] For example, in the back projection type multi-screen display device in said drawing 3 and drawing 35, a sufficient angle of visibility for both directions is not obtained.

[0024] In drawing 36, drawing of longitudinal section of said conventional projection type multi-screen display device. As shown in the figure, carried out from the position the viewer \*\* person 9 was [the position from the screen surface, an above angle of visibility will be about 45 degrees. However, since the problem to which a viewer \*\* person's degree of visibility angle to the screen method line direction 80 will be 45 degrees, and in the picture of appearance becomes large occurs in a screen upper part, an angle of visibility above [substantial] becomes still smaller.

[0025] Since a back projection display device had a weight of 5 kg, when the number of accumulated increased, the difficulty of the accompanying is.

[0026] There is a color shift from which a color changes with the degrees of view viewing angle as a problem which a back projection display device has. Since the angle which enters into the transmission type screen of each image lights of R, G, and B is different in the case of the system which uses three projection lenses, the degree of view viewing angle to which the light becomes strong according to R, G, and B exists also in the image lights to emit independently. Change of the color accompanying change of this degree of view viewing angle is called a color shift. As shown in said [drawing 3-1](#) in the back projection display device which uses the conventional projected type cathode-ray tube, the projection lens of R and B meets a transmission type screen with the angle of about  $45^{\circ}$  and  $10^{\circ}$ , respectively. This angle is called angles of convergence. R, G, and B which are emitted from a transmission type screen here - - since the difference of the degree of view viewing angle to which another image lights become the strongest is amended by the transmission type screen, it becomes about  $50\%$  of angles of convergence. However, an about  $5^{\circ}$  - degree difference is still among the degree of view viewing angle of image lights which become the strongest according to R, G, and B. For this reason, when a screen is incorporated and it combines, there is a problem from which especially a screen joins together and a color changes rapidly in a part.

[0027] [Drawing 3-7](#) is an expansion schematic diagram in the conventional back projection type multiscreen display device in which a screen's joining together and showing the cross section of a part. In the figure, the screen 65 (rectangle symbol) is together put with the angle of  $30^{\circ}$  degrees. Since a screen joins together at  $15^{\circ}$  degrees of the view person's  $9^{\circ}$  degrees of view viewing angle to screen method line direction  $80^{\circ}$  different on a screen on either side in a part as shown in the figure, change of the degree of view viewing angle turns into change of a color, and the problem from which the color of a screen on either side differs occurs.

[0028] When incorporating a screen, image lights enter from the screen which meets and the problem which worsens contrast of a picture occurs.

[0029] [Drawing 3-8](#) is a schematic diagram showing one example of the vertical section of the incorporated back projection type multiscreen display device. Since the phenomenon in which it is reflected in other screen surfaces, and the image lights emitted from the screen surface turn into the catoptric light 82, and turn

the view \*\* person 9 occurs when incurvating a screen as shown in the figure, the contrast of a picture deteriorates.

[ 0 0 3 0 ] The place which this invention was made in view of the problem conventional technology mentioned above has, and is made into the purpose the display system which realizes essential space which can give feeling while into an image at those who do view \*\* in providing, and to eye others. . The problem of a conventional front projection type dome shape display device is solved. It is bright, and is highly minute, and a projection arrangement providing the dome shape display device which does not become a view \*\* person's obstacle, It is in providing the back projection type multiscreen device which gives presence further to the image of the conventional back projection type multiscreen display device, and can cover all a view \*\* for views.

[ 0 0 3 1 ] In realizing the back projection type multiscreen display device shape, the place made into other purposes of this invention is lightweight, and there is in providing the simple back projection display device of an assembly

[ 0 0 3 2 ] The place made into the purpose of further others of this invention improving change of a color [ in / it joins together and / a part ] and the of a picture which are the problems of the incurvated conventional back projection type multiscreen display device, and also providing a high degree back projection type multiscreen display device.

[ 0 0 3 3 ]

[ Means for Solving the Problem ] It has back projection type multiscreen composition which makes two or more back projection display devices adjacent obtains a big screen in this invention, The aforementioned purpose is attained using a trapezoid, a polygon with a with an angles of 90° or more angle. bowl-shaped three-dimensional curved surface shape of shape of a transmission screen of a proper thing of each back projection display devices.

[ 0 0 3 4 Figure 1 is a perspective view showing one example of composition of back projection type multiscreen display device of this Invention is one example of shape of each transmission type screen.

[ 0 0 3 5 ] As shown in Figure 1 and Figure 2, this invention is the composition of obtaining length and a screen which curved in horizontal both directions, but including not only the conventional rectangular but trapezoid shape in shape

transmission type screen of a back projection display device. In order to obtain length and a screen which curved in horizontal both directions in this invention, Right 12th page body structure which uses structure of only a trapezoid transmission type screen, and a transmission type screen of a right pentagon in addition to the above-mentioned composition, or its part, 32nd page body structure (32nd page body structure which consists of the 12th page of a right pentagon, and the 20th page of a right hexagon; what is called truncated 20 face piece) of a football form -- or -- the -- in said screen composition, three-dimensional curved surface shape is also further used by each transmission type screen itself in part.

[0036] In this invention, in order to raise presence of a picture further, a floor and composition which carries out view of the image over a passage are also taken by using transparent construction material for composition, a floor, and a passage which are made into a form which takes out and looks into an image below a view of a person's step. A view of a person's back and a lower part are used as an entrance of dome shape, and also by using a door of an entrance as a back projection display device, are hard to be visible in an entrance from a view of a person, or it is made not visible at all, and composition which raises presence further is also taken.

[0037] In order to consider it as structure which can assemble simply a back projection type multiscreen display device with transmission type screen shape in this invention, The screen side adopts as a screen buck of each back projection display device multi-truncated pyramid shape (shape which cut off the head side of a hollow multiple cone) of hollow which becomes narrow, or, Or a screen buck and a projection arrangement buck are made into another structure, and structure which can assemble only a screen buck first is taken.

[0038] Drawing 19 is a cross-sectional view of one example of a back projection type display device which uses multiple frustum shape for a screen buck. In the figure, the screen side is making narrow composition to the unit buck 4 3 side, at the screen buck 4 2 which supports the screen 4 1 has composition that an adjoining screen frame can contact in fields mutually.

[0039] Drawing 20 is drawing of longitudinal section of one example of a back projection type display device which made a screen buck and a projection arrangement buck another structure. In the figure, a back projection display

device, It consists of the projection arrangement buck 46 supporting the screen buck 42 which supports the screen 41, the unit buck 45 supporting the screen buck 42, the projection arrangement 4, and the projection arrangement 4, and structure which the screen buck 42 supports to the unit buck 45 is made. And an assembly object of the screen buck 42 and the unit buck 45 has composition of becoming independent independently.

[0040]In the above-mentioned composition, when assembling a back projection type multiscreen display device, the unit buck 45 is assembled first, the screen buck 42 is attached to the unit buck 45 after that, and, finally the projection arrangement 4 and the projection arrangement buck 46 are constructed.

[0041]In order to raise image quality of a multiscreen display device of a dome shape in this invention, Arrangement of three projection lenses is made into structure arranged on each vertex of 2 equilateral triangle instead of in-line arrangement arranged in one conventional row wide three, or composition which uses conventional not a lenticular lens sheet but micro lens sheet for a transmission type screen is taken.

[0042]Drawing 22 is a front view showing one example of arrangement of a projection lens and a projected type cathode-ray tube in a case of having arranged three projection lenses on each vertex of 2 equilateral triangle. As shown in the figure, the projected type cathode-ray tube 61 of G is shifted to rectangular directions, and the projected type cathode-ray tubes 62 and 63 of R and B are considered as next to each other and 2 equilateral triangle arrangement. In this invention, when one body changes what was attached independently three conventionally about a bracket which connects a projected type cathode-ray tube and a projection lens, it is constituted also so that a weight saving may be attained.

[0043] Drawing 21 is a perspective view showing an important section of a transmission type screen. In the figure, a transmission type screen is two-sheet composition which consists of the micro lens sheet 51 and Fresnel lens sheet 50. The light incidence face 54 of the micro-lens lens sheet 51 is making shape where followed a picture horizontal direction and a screen perpendicular direction, and a micro-lens element of a convex was arranged in the Fresnel lens sheet side. Furthermore, the light emitting surface 55 is making shape where followed a picture horizontal direction and a screen perpendicular direction, and a micro-lens



element of a convex was arranged in the view \*\* side. And a flat surface part of the shape of a lattice projected more highly than a lens is provided in a boundary part between micro-lens elements of the light emitting surface 55, and the lattice-like light absorption band 56 is formed on it. An area ratio of this light absorption band is 75 % of the area of a light emitting surface of a micro lens sheet.

[ 0044 ]

[ Function] In this invention, as a result of examining the angle of visibility of projection type multiscreen display, the mainly following facts were found. Therefore, it is originated.

[ 0045 ] In order for a viewer to get the presence which can be abstract an image, I think that about 50 degrees of pictures which can cover the angle of visibility of about 120 degrees horizontally are perceptually required. multiscreen display of the conventional flat surface, in order to cover this angle of visibility, when a viewer is 1.5 m away from a screen, about 70 inches and a big screen about 200 inches wide are needed. Also in the case where the above-mentioned big screen is constituted, since a viewer's degree of viewing angle to a screen method line will be about 65 degrees, distortion of the picture seen from the viewer is intense, and it is hard coming to carry on view in the screen of an end. When the degree of viewing angle to a screen method line is large, image lights do not fly in the direction in which a viewer is located, but the luminosity of appearance falls victim.

[ 0046 ] Therefore, as for the screen of right and left ends, and the screen connected, in the screen composition which covers the aforementioned angle of visibility, it is desirable for at least 30 degrees to incline to a viewer.

[ 0047 ] In this invention, a transmission type screen with shape other than transmission type screen of the conventional rectangle is used.

Therefore, since the screen of right and left ends and the screen of the upper and lower ends can be freely leaned to the viewer side, an angle of visibility can be extended in the area of fewer screens.

Since it is possible to lean a screen method line to the viewer side, there is little distortion of the picture of appearance and a bright picture can be provided.

[ 0048 ] According to this invention, since it is [ image ] extensible also to d

a perimeter enclosure and also a view \*\* person ], also when a view \*\* person moves the head or it takes advantage, the break of a picture is lost and it also becomes possible easily to raise presence further.

[0049]When the projection arrangement of a method with the projection lens of 2 equilateral triangle arrangement is adopted, since the angles of convergence of the projection lens of R and B of a picture horizontal direction can decrease to conventional 50% with \*\*10 to [ conventional ] \*\*5 degrees, A color shift can also be reduced to conventional 50%, and the phenomenon in which the colors of the picture between each back projection display device differ can be eased. However since the projection lens was conventionally located in a line with one row at this time, a color shift is not generated in a screen perpendicular direction, but in 2 equilateral triangle arrangement by this invention, \*\*4 degrees of angles of convergence occur perpendicularly. However, since the absolute value of angles of convergence becomes to the former below in half, change of a color is no longer a size which poses a problem.

[0050]Since it is able for the light absorption band of a light emitting surface to consist lattice- like of a pattern of the conventional pinstripes, and to raise an area ratio to about 150% of the conventional lenticular lens sheets by using a micro lens sheet for a transmission type screen, Reduction of surface reflection of the image lights which enter from other screens is attained, and it can provide 50% of the conventional lenticular lenses with the good image of contrast.

[0051]In order to be able to aim at reduction of the weight of a projection arrangement by unifying the bracket of three projection lenses of a projection arrangement again and also to make the buck of a screen into what can become independent alone, Even when the weight saving of the buck of a projection arrangement is carried out, intensity becomes enough, and the whole weight saving of it becomes possible, and it can be made into the structure which can be assembled easily.

[0052]The back projection type multiscreen display device by this invention explained above, By using for the graphic display of display systems, such as training devices, such as a game device of an amusement park, a driving simulator, and a flight simulator. Since an image with a larger angle of visibility is acquired and more powerful presence can be given by this, those who do view \*\* can be provided with the false space which gives feeling which enters into an

image — a feeling of presence — producing a certain consciousness — the quality of play, or training of training — a degree can be raised.

[0053]

[Example] Hereafter, each working example illustrating the details of this invention explains.

[0054] <The 1st working example> The 1st working example of this invention is first described using drawing 1 - drawing 4. Drawing 1 is a perspective view showing the outline of the back projection type multiscreen display device concerning the 1st working example of this invention. The back projection type multiscreen display device of this example has taken the composition which consists of a back projection display device with the screen shape of the rectangle of the aspect ratio 4: 3, and a back projection display device in which the ratio of the length of a base and a top chord has the trapezoid screen shape of 4: 3.

[0055] As shown in drawing 1, the back projection type multiscreen display device of this example is composition which consists of three steps of length, and four steps of width.

Four back projection display devices of the highest rung have trapezoid transmission type screen shape, and the lower 2 step back projection display device has rectangular transmission type screen shape.

And the back projection display device of the highest rung has the composition of falling down ahead.

The whole screen is what curved in the transverse direction.

[0056] In drawing 1, the screen buck with which 1 held the rectangle screen and 2 held the rectangle screen 1, and 3, The trapezoid screen buck with which the unit buck which contained the projection arrangement 4 and attached the screen buck 2 to the front face, and 5 held the trapezoid screen, and 6 held the trapezoid screen 5, and 7 are the unit bucks which contained the projection arrangement which is not illustrated and attached the trapezoid screen buck 6 to the front face. 8 is the buck which carried and held the back projection type multiscreen display device.

[0057] (a) drawing 2 is a front view showing the rectangle screen 1 which drawing 1 described above, and (b) drawing 2 is a front view showing the

trapezoid screen 5 which drawing 1 described above. As shown in (a) of drawing 2, the ratio of a back projection display device (rectangle screen 1) with rectangular transmission type screen shape in every direction is set to 4:3, and the length of a screen vertical angle is 40 inches. As shown in (b) of drawing 2, 4 and all the remaining neighborhoods are set to 3, and, as for the ratio of the neighborhood of a back projection display device (trapezoid screen 5) with trapezoid transmission type screen shape, in the length of the base, the base has become the same as that of the length beside the rectangle screen 1.

[0058] Drawing 3 is a cross-sectional view showing the composition of a back projection display device with rectangular screen shape in the back projection type multiscreen display device of drawing 1. As shown in the figure, the back projection display device with the screen shape of the rectangle of this example has an angle of about 30 degrees mutually, and is arranged.

[0059] Drawing 4 is drawing of longitudinal section showing the composition of the lengthwise direction of the back projection type multiscreen display device of drawing 1. As shown in the figure, to a back projection display device with rectangular screen shape, the back projection display device with the trapezoid screen shape of the back projection type multiscreen display device of this example has an angle of about 35 degrees, falls ahead and is arranged.

[0060] Next, the operation which the back projection type multiscreen display device of this example has is explained. The image lights emitted from the projection arrangement 4 of each back projection display device penetrate the transmission type screens 1 and 5, and reach the viewer's eyes. Here, when the viewer sits on a 1.5-m position and does view of the screen from the screen center, as shown in drawing 3, a horizontal angle of visibility will be 120 degrees. As shown in drawing 4, a vertical angle of visibility becomes down [ 10 degrees of ], and above [ 50 degrees of ]. Therefore, if all the images that adjoined are added, the picture which can give sufficient presence for the viewer's view can be provided.

[0061] The back projection type multiscreen display device in this example has [ top ] a large angle of visibility of a longitudinal direction, and an image with presence can be provided so that clearly from the above explanation. A sufficient luminosity and definition are securable by considering it as a 12th page multiscreen system.

[0062]The back projection type multiscreen display device of this example, Since a back projection display device with the transmission type screen of the rectangle by conventional technology can be used and also it can build with two kinds of back projection display devices of a back projection display device with the transmission type screen of a rectangle and a trapezoid, it excels in productivity.

[0063]Although this example makes 3x4 steps of composition, it is clear for various combination, such as not being restricted to this composition in this invention, and enlarging the angle between extension or a screen for length and the lateral number of cores, to be also possible.


[0064]<The 2nd working example> Then, the 2nd working example of this invention is described using drawing 5 - drawing 8. Drawing 5 is a perspective view showing the outline of the back projection type multiscreen display device concerning the 2nd working example of this invention. The back projection type multiscreen display device of this example consists of six steps of length, and six steps of width, and is constituted by the back projection display device which has trapezoid transmission type screen shape altogether.


[0065]A horizontal direction and a perpendicular direction have an angle of 20 degrees mutually, and the back projection display device of this example shown in drawing 5 is put together. And the back projection type multiscreen display device by this example is constituted by the back projection display device with three kinds of trapezoid transmission type screen shape.

[0066]The trapezoid screen in which 11 has the 1st trapezoidal shape in drawing 5, the trapezoid screen buck with which 14 held this trapezoid screen 11, The unit buck with which this trapezoid screen buck 14 was attached 17, The trapezoid screen in which 12 has the 2nd trapezoidal shape, the trapezoid screen buck with which 15 held this trapezoid screen 12, The unit buck with which, as for 18, this trapezoid screen buck 15 was attached, the trapezoid screen in which 13 has the 3rd trapezoidal shape, the trapezoid screen buck with which 16 held this trapezoid screen 13, and 19 are the unit bucks with which this trapezoid screen buck 16 was attached. The back projection display device of the bottom in the highest rung, It has the trapezoid screen 13 of the 3rd trapezoidal shape, the bottom to the 2nd step and the 2nd step of back projection display device has the trapezoid screen 12 of the 2nd trapezoidal shape from a top similarly, and two steps of

central back projection display devices have the trapezoid screen 11 of the 1st trapezoidal shape.

[0067](a) of drawing 6 is a front view of the trapezoid screen 13 of the 3rd above-mentioned trapezoidal shape, and (b) of drawing 6 is a front view of the trapezoid screen 12 of the 2nd above-mentioned trapezoidal shape, and it is a front view of the trapezoid screen 11 of the 1st trapezoidal shape that carried out (c) above of drawing 6. The length of the base of the transmission type screen (trapezoid screen 13) of the back projection display device of the bottom in the highest rung. It is equal to the length of the top chord of the transmission type screen (trapezoid screen 12) of the 2nd step and the 2nd step of back projection display device from the bottom from a top. The length of the base of the transmission type screen (trapezoid screen 12) of the bottom to the 2nd step and the 2nd step of back projection display device is equal to the length of the top chord of the transmission type screen (trapezoid screen 11) of two steps of central back projection display devices from the top.

[0068]Drawing 7 is a schematic diagram of the cross section in the center of a height direction of the back projection type multiscreen display device of this example. As shown in the  gure, the back projection type multiscreen display device of this example has composition in which a screen on either side encloses the view \* \* person 9 with the degree of view viewing angle of 160 degrees.

[0069] Drawing 8 is a schematic diagram of the vertical section in the center of horizontal of the back projection type multiscreen display device of this example. As shown in the  gure, both the back projection type multiscreen display devices of this example incline in the direction in which the upper and lower sides of a screen turn on the view \* \* person 9, and have composition in which an up-and-down screen encloses the view \* \* person 9 with the degree of view viewing angle of 130 degrees. In this example, the lower end of the screen is constituted so that it may become below the floor line 20 for view \* \* in which the view \* \* person 9 stands.

[0070] Next, the operation which the back projection type multiscreen display device of this example has is explained. The image lights emitted from the projection arrangement of each back projection display device penetrate the transmission type screens 11, 12, and 13, and reach the view \* \* person 9. At this time, the view \* \* person 9 in the height for which the position of eyes comes in the

center of a back projection type multiscreen display device. When it rises in the 1.5-m-away position from the screen in transverse plane of central and view \*\* of the picture is carried out, as are shown in drawing 7, and it has an angle of visibility of about 160 degrees horizontally and is shown in drawing 8, it has an angle of visibility of every about 65 degrees of upper and lower sides perpendicularly. Since the lower end of a screen is located below the height of the floor line 20 for view \*\*, it becomes the composition that an image spreads to a step.

[ 0071 ] Also in the back projection type multiscreen display device of this example the high image of presence with a large angle of visibility can be provided like the back projection type multiscreen display device of said 1st working example as mentioned above. A sufficient luminosity and definition are securable by considering it as a multiscreen system.

[ 0072 ] To said 1st working example, the back projection type multiscreen display device of this example is more nearly spherically near, and can realize the back projection type multiscreen display device which can give natural presence. Since it becomes the composition that an angle of visibility is larger and an image spreads to a step to said 1st working example again, it becomes possible to realize higher presence.

[ 0073 ] Although this example is 6x 6 steps of composition, it is clear that it is a possible for it not to be restricted to this composition in this invention, to enlarge the angle of extension or a screen for the lateral number of cores, and to cover a semicircle or the perimeter. When the perimeter is considered as wrap composition, a lengthwise direction is extended, and it is also possible to provide a perfect dome screen projection image by putting the screen of the regular polygon of the number of the lateral numbers of screen composition on a ceiling part.

[ 0074 ] < The 3rd working example > Then, the 3rd working example of this invention is described using drawing 9. Drawing 9 is a perspective view showing the screen composition of the back projection type multiscreen display device concerning the 3rd working example of this invention. A projection arrangement, the screen supporting structure, etc. are omitted for the sake of the convenience which shows the composition of a screen clearly in the figure.

[ 0075 ] As shown drawing 9, the back projection type multiscreen display device

of this example is constituted as what made the narrow tunnel shape of the entrance. After the screen composition of this example extended the back projection type multiscreen display device of said 2nd working example to the transverse direction and making it into cylindrical shape, it is what was leaned beside 90 degree.

The opening of both sides is constituted as an entrance and an exit.

Between the entrance and the exit, the 1-m-wide transparent passage 21 for view \*\* is formed, and the passage 21 for view \*\* serves as the form where it is coated while tunneling in the shape of a pons.

[ 007 6 ] Next, the operation which the back projection type multiscreen display device of this example has is explained. The image lights emitted from the projection arrangement of each back projection display device penetrate a transmission type screen, and reach a view \*\* person. At this time, since a view \*\* person becomes a form enclosed by the tunnel form image and also can carry out view \*\* of the picture underfoot over a pons-like passage, he can provide a picture with higher presence. At this time, as for the width of a pons-like passage, presence fades at not less than 2 m. However, it is dangerous with 0.5 m or less, and is not suitable. In this example, since the diameter of an entrance becomes narrow to an inside, an entrance can direct \*\*\*\*\* and higher presence.

[ 007 7 ] The back projection type multiscreen display device of this example can provide the high image of presence with a large angle of visibility as well as said each working example as mentioned above. A sufficient luminosity and definition are securable by considering it as a multiscreen system.

[ 007 8 ] In the back projection type multiscreen display device of this example, since a view \*\* person acquires the feeling to which a pons is crossed in false space, he can provide an image with still higher presence.

[ 007 9 ] < Working example 4 > Then, the 4th working example of this invention described using drawing 10 and drawing 11. Drawing 10 is a perspective view showing the screen composition of the back projection type multiscreen display device concerning the 4th working example of this invention. A projection arrangement, the screen supporting structure, etc. are omitted for the sake of the convenience which shows the composition of a screen clearly in the figure.

[ 008 0 ] As shown in drawing 10, the screen in the back projection type multiscreen display device of this example is constituted as a part of right 12 face pieces



which a globular form circumscribes.

It is constituted by a back projection display device with the transmission type screen shape (right pentagon screen 25) of a right pentagon, and six sets.

[0081] Drawing 11 is a perspective view containing the projection arrangement of the back projection type multiscreen display device of this example. In the figure, the screen buck with which 27 held the right pentagon screen 25, and 28 are the unit bucks which contained the projection arrangement 4 and held the screen buck 27. As shown in drawing 11, each projection arrangement 4 is located in the outside of a dome, and is arranged in the form which encloses the view \* \* person 9. The seat 23 for view \* \* has the composition of entering from back in a dome after it has structure which can be slid forward and backward and the view \* \* person 9 sits down on the seat 23 for view \* \*.

[0082] Next, the operation which this example has is explained. The image lights emitted from the projection arrangement of each back projection display device penetrate a transmission type screen, and reach a view \* \* person. At this time, to a view \* \* person, not less than 150 degrees and above can be provided with about 120 degrees, and, as for the back projection type multiscreen display device of this example, it can provide right and left with a picture with an angle of visibility of about 40 degrees downward.

[0083] The back projection type multiscreen display device of this example can provide the high image of presence with a large angle of visibility as well as said each working example as mentioned above. A sufficient luminosity and definition are securable by considering it as a multiscreen system.

[0084] On a view \* \* person, since the back projection type multiscreen display device of this example can provide a wrap picture for the view of a longitudinal direction nearly thoroughly, it can provide higher presence. Since dome shape is spherically near, it is possible to see on the normal of all the centers of a transmission type screen, and to bring an apparent position close, and a comfortable dome shape picture can be provided. Since the view \* \* person who attached back to the specified position by considering it as an entrance again cannot have a seen entrance in the state of stigmatism, presence will increase further further.

[0085] Since the back projection type multiscreen display device of this example

can build a system only by one kind of a back projection display device with the transmission type screen shape of a right pentagon, it excels in productivity.

[0086]Although this example is the false hemisphere type composition by six sets of back projection display devices, it is clear that it is also possible for it not to be restricted to this composition in this invention, and to extend the number of composition.

[0087]<The 5th working example> Then, the 5th working example of this invention is described using drawing 12 and drawing 13. Drawing 12 is a perspective view showing the screen composition of the back projection type multiscreen display device concerning the 5th working example of this invention. A projection arrangement, the screen supporting structure, etc. are omitted for the sake of the convenience which shows the composition of a screen clearly in the figure.

[0088]The screen surface of the back projection type multiscreen display device of this example is constituted so that a globular form may be circumscribed.

. By all the surfaces of a sphere, 12 sets and when 20 sets are used, form a back projection display device with the transmission type screen shape of a right pentagon and a right hexagon, respectively. It is together put so that it may become a part of 32nd page body structure ( 32nd page body structure which consists of the 12th page of a right pentagon, and the 20th page of a right hexagon; what is called truncated 20 face piece) of a football form.

Namely, the screen of the back projection type multiscreen display device of this example, A back projection display device with the transmission type screen shape ( right pentagon screen 25) of a right pentagon Six sets, It is constituted a false semi- spherical thing which uses ten back projection display devices with the transmission type screen shape ( right hexagon screen 26) of a right hexagon respectively.

Rather than the dome of said 4th working example, it is a thing nearer to a surface of a sphere.

[0089 ]. It can set to a back projection display device with the transmission type screen shape of a right pentagon and a right hexagon. The length of each neighborhood of the right pentagon screen 25 and the right hexagon screen 26 is 20 inches, and a diameter of sphere is set to about 4 m, and serves as a false semi- spherical dome of sufficient size for the view of one person

persons to do view \*\* of the image of the circumference of the whole sky.

[0090] Drawing 13 is a schematic diagram of the important section cross section of the back projection type multiscreen display device of this example. As shown in the figure, the floor line 20 for view \*\* which installed the seat 30 for view \*\* where two or more view \*\* persons sit down comprises this example, as pressed in a dome from down.

[0091] Next, the operation which the back projection type multiscreen display device of this example has is explained. The image lights emitted from the projection arrangement of each back projection display device penetrate a transmission type screen, and reach a view \*\* person. this time - a view \*\* person - the right and left and above whole sky - view \*\* becomes possible about the picture which spreads in a circumference.

[0092] The back projection type multiscreen display device of this example can provide the high image of presence with a large angle of visibility as well as said each working example as mentioned above. A sufficient luminosity and definition are securable by considering it as a multiscreen system.

[0093] The picture which the back projection type multiscreen display device of this example has a large angle of visibility which does not break off to right and left and above, and has higher presence can be provided. Since dome shape is close to a globular form, it is possible to see on the normal of all the centers of a transmission type screen, and to bring an apparent position close, and a comfortable dome shape picture can be realized with two kinds of screen shape, right pentagon and a right hexagon, again. Since the entrance of the view \*\* person who attached the lower part to the specified position by considering it as an entrance again does not look almost, presence will increase further further.

[0094] Although this example is the false semi-spherical composition which uses 16 sets of back projection display devices, it is clear that it is also possible for it not to be restricted to this composition in this invention, and to extend or reduce the composition number of machines.

[0095] The structure for which it has been pressed in a dome from down by the seat for view \*\* where the view \*\* person who showed by this example sits down, Since it can apply also in other working example of this invention with the back projection type multiscreen display device of a dome shape and an exit is not visible to the view \*\* person attached to the specified position also in such a case,

it is clear to have the effect that presence in creases.

[ 0 0 9 6 ] < The 6 th work in g ex am ple> Then , the 6 th work in g ex am is d e s c r i b e d u s i n g a w i n g a n d d r a w i n g . 1 Draw in g 1 is a schematic d i a g r a m of the imp o r t a n t s e c t i o n c r o s s s e c t i o n of the b a c k p r o j e c t i o n t y p e m u l t i d i s p l a y d e v i c e c o n c e r n i n g the 6 th work in g ex am ple of this i n v e n t i o n . the c o m p o s i t i o n of a s c r e e n is m a i n l y s h o w n , a n d p r o j e c t i o n a r r a n g e m e n t o m i t t e d f o r s i m p l i f i c a t i o n of a g r a p h i c d i s p l a y .

[ 0 0 9 7 ] The s c r e e n s u r f a c e of the b a c k p r o j e c t i o n t y p e m u l t i s c r e e n of this ex am ple is c o n s t i t u t e d s o t h a t a g l o b u l a r f o r m m a y b e c i r c u m s c r i b e d . B y a l l t h e s u r f a c e s of a s p h e r e , 1 2 s e t s r e a c h , r e s p e c t i v e l y a n d a b a c k d i s p l a y d e v i c e w i t h the t r a n s m i s s i o n t y p e s c r e e n s h a p e of a r i g h t p e n t a g o n i s u s e d . 2 0 s e t s , I t i s t o g e t h e r p u t s o t h a t i t m a y b e c o m e p a g e b o d y s t r u c t u r e ( 3 2 n d p a g e b o d y s t r u c t u r e w h i c h c o n s i s t s of a r i g h t p e n t a g o n , a n d the 2 0 t h p a g e of a r i g h t h e x a g o n ; w h a t i s t r u n c a t e d 2 0 f a c e p i e c e ) of a f o o t b a l l f o r m .

. I t c a n s e t t o a b a c k p r o j e c t i o n d i s p l a y d e v i c e w i t h the t r a n s m i s s i o n t y s h a p e of a r i g h t p e n t a g o n a n d a r i g h t h e x a g o n . The l e n g t h of e a c h n o f the r i g h t p e n t a g o n s c r e e n 2 5 a n d the r i g h t h e x a g o n s c r e e n 2 6 i s 2 a n d a d i a m e t e r of s p h e r e i s s e t t o a b o u t 4 m , a n d h a s b e c o m e a t h i n g c o s p h e r i c a l s h a p e of s u f f i c i e n t s i z e f o r the v i e w \* \* p e r s o n of o n e p e r p e r s o n s t o d o v i e w \* \* of the i m a g e of the u p p e r a n d l o w e r s i d e s a n d e n c l o s u r e o n e i t h e r s i d e .

[ 0 0 9 8 ] A s s h o w a w i n g . 1 4 n the b a c k p r o j e c t i o n t y p e m u l t i s c r e e n d e v i c e of this ex am ple , the t r a n s p a r e n t f i g u r e l i n e 3 1 a s a f i g u r e l i n e f w h i c h the v i e w \* \* p e r s o n 9 s t a n d s i s i n the i n s i d e of a s p h e r i c a l s h a p e , c o m p o s i t i o n i n a p o s i t i o n h i g h e r t h a n the l o w e r e n d of a s c r e e n . The t r a i f i g u r e l i n e 3 1 i n w h i c h the v i e w \* \* p e r s o n 9 s t a n d s m a k e s a s u b j e c t v m a t e r i a l w h i c h p e n e t r a t e s l i g h t s , s u c h a s t e m p e r e d g l a s s , a n d c o m p r i s e s f r a m e s u p p o r t i n g i t , e t c .

[ 0 0 9 9 ] a w i n g . 1 5 a c r o s s - s e c t i o n a l v i e w s h o w i n g the i m p o r t a n t s e c t i o n of b a c k p r o j e c t i o n t y p e m u l t i s c r e e n d i s p l a y d e v i c e of this ex am ple . A s f i g u r e , the b a c k p r o j e c t i o n t y p e m u l t i s c r e e n d i s p l a y d e v i c e of this l o c a t e d i n the t r a n s v e r s e d i r e c t i o n of a s p h e r i c a l s h a p e d o m e , a n d t w o b p r o j e c t i o n d i s p l a y d e v i c e s w h i c h h a v e the t r a n s m i s s i o n t y p e s c r e e n s h a p

\*\*\*\*\* right hexagon up and down have a structure movable on the outside.

Two back projection display devices as this movable unit 35 are moved as shown in drawing 15, and it is constituted so that a view \*\* person's entrance may be formed.

[0100]Next, the operation which the back projection type multiscreen display device of this example has is explained. The image lights emitted from each back projection display device penetrate a transmission type screen, and reach a view \*\* person. since the above-mentioned entrance is also closed by the back projection display device at this time -- a view \*\* person -- the 360-degree whole sky -- view \*\* becomes possible about the picture which spreads in a circumference. As for a view \*\* person, view \*\* becomes possible also for the image which was made with transparent construction material and which is in the position below its step over a floor line.

[0101]The back projection type multiscreen display device of this example can provide the high image of presence with a large angle of visibility as well as said each working example as mentioned above. A sufficient luminosity and definition are securable by considering it as a multiscreen system.

[0102 ]since, as for the back projection type multiscreen display device of this example, an entrance is shut with a back projection display device -- the perfect whole sky -- the picture which has a circumferential large angle of visibility of 360 degrees, and has very high presence can be provided. In a top, since not only a longitudinal direction but the image of right under can carry out view \*\*, a view \*\* person is the feeling which floated in the air.

The image which has presence more can be provided.

Since dome shape is close to a globular form, it is possible to see on the normal of all the transmission type screens, and to bring an apparent position close, and a comfortable dome shape picture can be realized again in two kinds of transmission type screen shape, a right pentagon and a right hexagon.


[0103]Although domes are 32 face pieces which comprise a right pentagon and a right hexagon, this example, in this invention, the composition which uses a transparent floor, and the composition which uses a back projection display device as the door of an entrance have the same effect, also when it applies to the back projection type multiscreen display device of other working example.

[0104]Right 20th page dignity or its part is formed combining the transmission type screen of the shape of two or more triangle, and using the false surface of a sphere which consists of this right 20th page dignity, or its part, even if it forms a dome shape screen, it does not interfere again.

[0105]Although concave screens, such as a dome shape constituted combining two or more planate transmission type screens, mainly showed what is a part of false surface of a sphere formed versatily or false surface of a sphere in each working example which has again the planate transmission type screen mentioned above, The false ellipsoid side which consists of many sides (two or more planate transmission type screens), or its thing [ constituting so that it may become a part ] is also possible for the concave screen formed versatily, Or the pseudorotation curved surface which consists of many sides (two or more planate transmission type screens), and uses a constant curve as a bus line mostly, or its thing [ constituting so that it may become a part ] is also possible.

[0106]<The 7th working example> Then, the 7th working example of this invention is described using drawing 16 - drawing 18. Drawing 16 is drawing of longitudinal section showing the important section of the back projection display device used for the back projection type multiscreen display device concerning the 7th working example of this invention. The dome shape of the back projection type multiscreen display device in this example is constituted as what makes a part of 12 face pieces which combine the transmission type screen of identical shape. Each transmission type screen is a thing of the shape which shows projection near a right pentagon, when it sees from a transverse plane.

[0107]As shown in drawing 16, the back projection display device of this example serves as the concave screen 40 of three-dimensional curved surface shape with which the shape of the transmission type screen sees from the view \*\* person side, and serves as a concave surface.


[0108]Drawing 17 is a perspective view in the transmission type screen (concave screen 40) simple substance in the back projection display device of this example. As shown in the  gure, the three-dimensional curved surface of the concave screen 40 is the same as the screen curved surface of the whole back projection type multiscreen display device, and each of that neighborhood is a geodesic line positive pentagon on a curved surface.

[0109] Drawing 18 is a perspective view showing the screen composition of the back projection type multiscreen display device of this example built combining the above-mentioned concave screen 40 six sheets. A projection arrangement, the screen supporting structure, etc. are omitted for the sake of the convenience which shows the composition of a screen clearly in the figure. As shown in drawing 18, it is in the state which combined the three-dimensional curved surface shape of each transmission type screen (concave screen 40) in this example, it is constituted so that the screen curved surface of the whole back projection type multiscreen display device may be formed, and the shape of each transmission type screen (concave screen 40) is geodesic line positive pentagon shape, as described above.

[0110] Next, the operation which the back projection type multiscreen display device of this example has is explained. The image lights emitted from each back projection display device penetrate a transmission type screen, and reach a viewer's person. Here, the image lights emitted from the transmission type screen always have the directivity of the center of the strength equal to the normal of the transmission type screen in an emitting position. At this time, in this example, it is a joint part of a screen, and it is connected smoothly, without a screen bending. [0111] The back projection type multiscreen display device of this example can provide the high image of presence with a large angle of visibility as well as said each working example as mentioned above. A sufficient luminosity and definition are securable by considering it as a multiscreen system.

[0112] The transmission type screen (concave screen 40) of the back projector type multiscreen display device in this example, Without the joint of a screen bending, it is connected smoothly, and accumulates, splice doubling of an image becomes natural, and the high display system of the presence which does not make it conscious of it being a multiscreen can be provided.

[0113] Although the transmission type screen (concave screen 40) which has a three-dimensional curved surface of the geodesic line positive pentagon shape which projected the plane right pentagon on the surface of a sphere in this example, and the back projection type multiscreen display device which uses it were explained, it is clear that an effect with the same said of geodesic line polygonal shape, such as a right hexagon, a rectangle, and a trapezoid, is acquired.

[0114]Namely, a transmission type screen with the three-dimensional curved surface of the geodesic line quadrangle shape which projected the plane rectangle on the surface of a sphere, A transmission type screen with the three-dimensional curved surface of the geodesic line quadrangle shape which projected the plane trapezoid on the surface of a sphere is combined, It is obvious that a screen similar to said 2nd working example or the 3rd working example can be built combining a transmission type screen with the three-dimensional curved surface of three kinds of geodesic line quadrangle shape which projected that a screen similar to said 1st working example can be built and the trapezoid of three kinds of  at surfaces on the surface of a sphere. A transmission type screen with the three-dimensional curved surface of the geodesic line positive pentagon shape which projected the plane right pentagon on the surface of a sphere, It is obvious that a screen similar to said 4th working example or the 5th working example can be built combining a transmission type screen with the three-dimensional curved surface of the geodesic line positive hexagon shape which projected the plane right hexagon on the surface of a sphere. the surface of a sphere near the 20th page of false positive dignity which combines a transmission type screen with the three-dimensional curved surface of the geodesic line positive triangle shape which projected the plane right triangle on the surface of a sphere – better – even if \* \* uses the part, it is also obvious that a dome shape screen can be built.

[0115]Also when using a transmission type screen with the three-dimensional curved surface of geodesic line polygonal shape, a dome shape screen, It constitutes from a surface of a sphere or its part, and also an ellipsoid side, its thing [ constituting so that it may become a part ], or the rotation curved surface which uses a constant curve as a bus line mostly, or its thing [ constituting so that it may become a part ] is possible.

[0116]When a transmission type screen with the three-dimensional curved surface of geodesic line polygonal shape is used again, It will be assumed also when a transmission type screen does not become what has a three-dimensional curved surface of perfect geodesic line polygonal shape on production technology, and it will become the dome shape screens ( for example, the shape of a right 12th page bodily shape near a surface of a sphere, the shape of a right 20th page bodily shape near a surface of a sphere, etc. ) which have the curvatur



near a surface of a sphere, an ellipsoid side, etc. in this case.

[0117]As a screen unit in each back projection display device of a back projection type multiscreen display device with the screen composition by this invention mentioned already or mentioned later, As usual, the screen unit using a lenticular lens sheet may be applied, and a screen unit like the 10th working example mentioned later may be used. As a projection arrangement in each back projection display device of a back projection type multiscreen display device with the screen composition by this invention mentioned already or mentioned later, What carried out in-line arrangement of the projection system of R, G, and B may be used as usual, and a projection arrangement like the 10th working example mentioned later may be used.

[0118]<The 8th working example> Then, drawing 19 explains the 8th working example of this invention. Drawing 19 is a sectional view showing the important section of the back projection type multiscreen display device concerning the 8th working example of this invention. The back projection display device of the back projection type multiscreen display device of this example, The screen buck 42 which supports a transmission type screen (here rectangular screen 41), Multi-truncated pyramid shape of the hollow which becomes small [ area ] gradually toward the screen mounting part of the inner side to the front face (shape which cut off the head side of a multiple cone in the air; here) Making 4 truncated-pyramid shape of hollow which becomes one composition stage of a jump box, the inclination on each side to the bottom (inner side) in multiple frustum shape is 75 degrees. In this example, the transmission type screen (screen 41) has composition removed in the form stuffed into the inside of a back projection display device, and a transmission type screen is fixed to the screen buck 42 by the holddown member which is not illustrated. In mirawing 19, 43 is a unit buck which supports the screen buck 42.



[0119]And the back projection type multiscreen display device in this example has screen composition which added 3 0-degree inclination between adjoining transmission type screens.

[0120]Next, the operation which the back projection type multiscreen display device of this example has is explained. Since the screen bucks of a back projection display device serve as contact of a fixed even when two or more transmission type screens incline downward and are attached in this example, The

danger that a back projection display device will slip down to the inside of a screen decreases, and a stronger structure can be acquired. Since it is not the structure from which a transmission type screen separates downward directly when a transmission type screen needs to be removed by the maintenance of a projection arrangement, etc., the danger of dropping a screen decreases.


[0121]Above, according to this example, also when a transmission type screen side becomes the composition of turning to a lower part, covering it to a view \*\* person, and hanging, the buck structure with it which has little danger can be acquired. [ strong ]

[0122]<The 9th working example> Then, drawing 20 explains the 9th working example of this invention. Drawing 20 is a sectional view showing the important section of the back projection type multiscreen display device concerning the 9th working example of this invention. The back projection display device of the back projection type multiscreen display device of this example, The screen buck 42 which supports the screen 41, and the unit buck 45 supporting the screen buck 42, It has the projection arrangement 4, the projection arrangement buck 46 supporting the projection arrangement 4, and the connecting frame 47 that connects projection arrangement 4 comrades, and the screen buck 42 supports with the unit buck 45, and the assembly of the screen buck 42 and the unit buck 45 is constituted so that it may become independent independently. And the projection arrangement 4 has the structure where projection arrangement 4 comrades which are attached to the unit buck 45 from the outside, and adjoin are mutually connected with the connecting frame 47 via the projection arrangement buck 46. The adjoining unit buck 45 is mutually connected in an assembly state, and each screen buck 42 which adjoins via the assembly of the unit buck 45 by this is connected mutually.

[0123]Next, the operation which the back projection type multiscreen display device of this example has is explained. In this example, when assembling a back projection type multiscreen display device, Assemble the unit buck 45  rst and the screen buck 42 is attached to the unit buck 45 after that, After forming the screen of dome shape, the projection arrangement 4 is attached to the unit buck 45 via the projection arrangement buck 46, and,  nally projection arrangement 4 comrades are connected with the connecting frame 47.

[0124]In this example, it can assemble more simply by attaching the projection

arrangement 4 which has weight most by the whole set after attachment of the screen to the unit buck 45 so that clearly from the above explanation. A stronger structure can be acquired by making projection arrangements connect mutually. [0125]<Working example 10> Next, drawing 21 - drawing 23 explain the 10th working example of this invention. Drawing 21 is a perspective view showing the important section of the transmission type screen in the back projection display device of the back projection type multiscreen display device concerning the 10th working example of this invention. The transmission type screen of this example has two-sheet composition which consists of Fresnel lens sheet 50 and the micro lens sheet 51.

[0126]Fresnel lens sheet 50 forms a Fresnel lens like the sectional shape which the light emitting surface 53 shows to drawing 21, and the light incidence face 52 is a  at surface. The micro lens sheet 51 serves as the shape where the light incidence face 54 made the micro lens of the ellipse which made the light emitting surface 55 the 2nd focal position adjoin screen perpendicularity and level both directions mutually, and formed them in them. [ many ]

The shape in which many micro lenses of the light absorption band 56 in which the light emitting surface 55 has limited lattice-like width, and the ellipse which made the light incidence face 54 the 2nd focal position between them were formed is made.

In the light emitting surface 55 of the micro lens sheet 51, the width of every direction is almost the same, and, therefore, the light absorption band 56 and the micro lens of the area ratio of the light absorption band 56 in the light emitting surface 55 are 7 5%. A micro convex lens may be aspherical surface shape with the sectional shape near an ellipse.

[0127] Drawing 22 is a front view showing the important section of the projection arrangement in the back projection display device of the back projection type multiscreen display device of this example. The projection arrangement of this example is provided with the bracket 64 which connects the three projected type cathode-ray tubes 61, 62, and 63 which project the image of R, G, and B 3 color, the three projection lenses 60, and a projected type cathode-ray tube and a projection lens.

[0128]The projected type cathode-ray tubes 62 and 63 of R and B adjoin mutually, the three projected type cathode-ray tubes 61, 62, and 63 are installed

in parallel, and the projected type cathode-ray tube 61 of G is installed in the central upper part of the two projected type cathode-ray tubes 62 and 63. The three projection lenses 60 are arranged, respectively in the center of each projected type cathode-ray tubes 61, 62, and 63. Therefore, the three projection lenses 60 serve as arrangement located at the vertex of 2 equilateral triangle, respectively. the bracket 64 which connects a projected type cathode-ray tube and a projection lens -- one bracket -- R, G, and B -- it has integral construction which connects all the projected type cathode-ray tube and projection lens.

[0129]Next, the operation which the transmission type screen and projection arrangement of above-mentioned this example have is explained. The image lights emitted from the projection arrangement are changed into a light near in parallel by Fresnel lens sheet 50. And it is condensed and spread in the micro lens of the light emitting surface 55 with the micro lens of the light incidence face 54 of the micro lens sheet 51, and is emitted from a transmission type screen. At this time, the loss of image lights can be low suppressed by centralizing image lights only on the micro-lens portion of the light emitting surface 55. About the outdoor daylight reflection ( surface reflection) to which it enters into a transmission type screen from the exterior, and is reflected in a screen surface, and the contrast of a picture is reduced. Since the reflectance of the light absorption band 56 can regard it as about 0% very low, surface reflection can be reduced 50 more% to the composition of the conventional lenticular lens sheet which became 25% in case there is no light absorption band 56, and was described above.

[0130]Drawing 23 is a schematic diagram showing the cross section of the projection arrangement of this example, and the optical system of a transmission type screen. As shown in the figure, in this example, by having considered the projection lens ( projected type cathode-ray tube) of R, G, and B as 2 equilateral triangle arrangement, the interval of \* \* \* \* \* and a projection lens serves as a conventional ], and the projected type cathode-ray tubes 61 and 63 of R and B also reduce angles of convergence by half. The image lights emitted from the projection lens of R and B enter with the angle of \* \* 5 degrees to the transmission type screen 65, respectively. And it is changed into an almost parallel beam of light by the micro lens of the light emitting surface 55 of the micro lens sheet 51. At this time, the main optical axis of R and B will not be changed in parallel thoroughly, but the angle which the strongest light emits will shift from the normal

of about 2.5 degrees and a transmission type screen, respectively. However, in this example, the directional characteristics of about 5 degrees and light decrease to the case where the projection arrangement of the conventional in-line arrangement is used.

[0131] In this example, the width of a projection arrangement is reduced so that clearly from the above explanation, a miniaturization can be attained, and also a weight saving becomes possible by using an integral-type bracket. R, G, and B — change of the color of the joint of the display by color shift can be reduced to conventional 50% by reducing the difference of the directional characteristics of another light by half. Surface reflection of a screen is reduced in the conventional half, and it becomes possible to improve the contrast of a picture.

[0132] The 11th working example: Then, the 11th working example of this invention is described using [drawing 24](#) - [drawing 27](#). [Drawing 24](#) is a perspective view showing the important section composition of the display system concerning the 11th working example of this invention. In the figure and [drawing 25](#) which carries out a postscript, and [drawing 26](#), a projection arrangement, the screen supporting structure, etc. are omitted for the sake of the convenience which shows clearly the composition of the screen of the back projection type multiscreen display device by the system of this example.

[0133] The back projection type multiscreen display device used for the display system of this example has composition which consists of five steps of length, and five steps of width. And upper 2 step and lower 2 step are constituted by the back projection display device with two kinds of trapezoid transmission type screen shape ( trapezoid screens 11 and 12) , and inside one step, it is constituted by the back projection display device with rectangular transmission type screen shape ( rectangle screen 1) .

[0134] [Drawing 24](#), 9 and 23 are the above mentioned view \*\* persons and seats for view \*\*, and 100 is an imitation vehicle device and a transparent door at which motion RA ID O and 102 open and close a fixed base, 103 opens and closes an oscillation device, and, as for 101, 104 opens and closes the entrance of the view \*\* person 9 to the imitation vehicle device 100.

[0135] The imitation vehicle device 100 gives the view \*\* person 9 presence so that it resembles a actual vehicle device closely, but the weight saving of the portion which the view \*\* person 9 does not treat has been excluded and carried

out, and it is attached on motion RAIDO 101 in order to give agitation. This motion RAIDO 101 is attached to the oscillation device 103 which generates the agitation installed on the fixed base 102 fixed to the floor line. And power control of oscillation device 103 is carried out by the instructions from CPU for agitation control, and it is shaken by 6 frequency of a pitch, a roll, a yaw, a HEIB, a surge.

[ 0136] Figure 2.5 is a schematic diagram explaining getting on and off of the view \*\* person to the display system which used the back projection type multiscreen display device of this example. As shown in the figure, view \*\* the imitation vehicle device 100 of the display system of this example is formed inside the door 104 of an entrance.

The whole back projection type multiscreen display device is rotated up, and constituted so that the door 104 may be opened and it may board from an entrance after that.

When getting down, operation contrary to boarding is performed.


[ 0137 ] Here, since it is placed between motion RAIDO 101 by the oscillation device 103, the entrance of the imitation vehicle device 100 becomes high fairly rather than a floor line. Then, when boarding, a view \*\* person is put on the boarding step 105 in the position near a floor line, and after carrying out the lift rise of the boarding step 105 and moving a view \*\* person to near the entrance with the lifting device 107, a view \*\* person is sat on the seat 23 for view \*\*. The appropriate back carries out the lift down of the boarding step 105 with the device 107, and it is made to move to the position which interference of contact etc. does not produce even if the oscillation device 103 operates. When taking down a view \*\* person, it is carried out in operation contrary to the above.

[ 0138 ] Next, an operation of the back projection type multiscreen display used for the display system of this example is explained. An operation of projection type multiscreen display device of this example is modification shape explained in full detail in the 2nd above mentioned working example. Since it is almost the same as the already explained contents, detailed explanation is omitted here.

[ 0139] Figure 2.6 is important section drawing of longitudinal section of the display system of this example. The rectangle screen 1 and the trapezoid screen


11 and 12 of a back projection type multiscreen display device, Since it is inscribed in a ball about 2.2 m in radius, and is provided and the seat 23 for view \*\* is mostly arranged in the center of a ball, it becomes the composition of covering and hanging over the view \*\* person 9, and when the view \*\* person 9 who sat down on the seat 23 for view \*\* does view \*\* of the picture, it has an angle of visibility of about 70 degrees each of upper and lower sides in about 180 degrees and a perpendicular direction horizontally.

[0140]Next, composition and an operation of the display system of this example using an above back projection type multiscreen display device are explained.

[0141]Drawing 27 is a block diagram showing the important section composition of the control system in the system of this example. In the  gure, when 110 is the controls in the imitation vehicle device 100, for example, a vehicle is a car, the member used for operation of a handle, an accelerator pedal, a change lever, etc. is equivalent to this. 111 is CPU of the central computer which manages control by the whole system.

According to the detecting signal detected from the controls 110, generate the information about dynamic movement of a vehicle, and this is outputted, and an image when it moves in false, and acoustic information are generated.

112 is a graphics board and outputs a video signal to the display device ( back projection type multiscreen display device) 113 according to the information from CPU 111. 114 is a sound board and outputs an audible signal to the loudspeaker 115 according to the information from CPU 111. CPU which 116 is an agitation control device and performs proper data processing in response to the information from CPU 111, It is the thing having contained the control machinery which controls the oscillation device 103 directly according to the control command from this CPU, In response to the information signal ( information used as the foundation for computing acceleration) about dynamic movement from CPU 111, this is changed into the signal of each axis of 6 frequency, and the oscillation device 103 is controlled by the transform signal. 117 has stored the data etc. of the shape of the object in the space which is an imitation space data storage and operates the imitation vehicle device 100, a color, and sound.

[0142]In the display system of this example constituted as mentioned above,  rst the view \*\* person 9 takes a seat on the seat 23 for view \*\*, and directs the start up of a system. By this, CPU 111 reads a predetermined image and sound

information from the information on the imitation space data storage 117, This is supplied to the graphics board 112 and the sound board 114, respectively, and, as a result, an image and a sound are given by the display device 113 and the loudspeaker 115 to the view \*\* person 9.

[0143]Next, operation of the imitation vehicle device 100 is started with the controls 110, and the detecting signal about movement of a vehicle device is transmitted from the situation of an image and a sound where the view \*\* person 9 was given to CPU111 by this. CPU111 calculates dynamic movement of a vehicle according to this signal, and supplies the information about the movement magnitude and the move direction of a vehicle to the agitation control device 116. CPU of the agitation control device 116 calculates acceleration (a rotation system angular acceleration) in response to the signal from CPU111, controls the oscillation device 103 according to the direction and size, and gives a view \*\* person a feeling of acceleration (a feeling of acceleration is given in false). From the information about the movement magnitude and the move direction of a vehicle which calculated and obtained dynamic movement of the vehicle, CPU111 changes the position of the viewpoint in imitation space, reconstructs the image and sound according to a field of view, and gives them to a view \*\* person.

[0144]As a result, the view \*\* person 9 can carry out the pseudo experience of the state of movement of the imitation vehicle device 100 by having controlled oneself in imitation by the image, the sound, and a feeling of acceleration. At this time, the back projection type multiscreen display device by this example, by being able to provide the back projection type multiscreen display device of the 4th above mentioned working example, etc. and an image with a larger angle of visibility and presence high more than equivalent, and considering it as a multiscreen system, since a sufficient luminosity and definition are securable can \*\*, if presence is given by a view \*\* person.

[0145]To the 1st working example, the back projection type multiscreen display device by this example is closer to a spherical shape, and can realize the back projection type multiscreen display device which can give natural presence. Since it becomes the composition that an image spreads to a ceiling, it becomes possible to provide higher presence.

[0146]In this example, in order to give a feeling of acceleration, the oscillation device 103 was used, but since presence only with a high image is obtained, the



oscillation device 103 is not an indispensable device.

[0147]As a back projection type multiscreen display device used for the display system of this example, It cannot be overemphasized that it does not interfere besides the composition shown in drawing 24 - drawing 26 even if it is the composition of the back projection type multiscreen display device of other working example of this invention, and sufficient presence is obtained also in this case since the angle of visibility is large.

[0148]Skiing, a hang glider, etc. which do not restrict to a car and do not have the source of power may be sufficient as an imitation vehicle device.

[0149]Although only the false vehicle device is disturbed to this example, it is also possible to constitute a multiscreen display device so that you may make it shaken by a false vehicle device and one.

[0150]Even if the imitation vehicle device by which you make it shaken carries out only the seat for view \* \* and is view \* \* \* or a view \* \* person passage, it is effective in giving a feeling of acceleration.

[0151]False space may not be restricted to one, and may be prepared, and a view \* \* person may choose it. [ two or more ]

[0152]Since the display system and false space which are provided independently are used in common, if mutual CPU is connected by a means of communication, in two or more display systems, false space is sharable, and. It also becomes possible to output one's image ( image of the vehicle device by the side of self) the false space of other display systems as an image, and since a motion of the image is humane operation unlike the object by a computer, it is effective in presence increasing. At this time, the display system to form is not independently restricted to one.

[0153]< The 12th working example> Finally, the 12th working example of this invention is described using drawing 28 and drawing 29. Drawing 28 is the perspective view showing the important section composition of a display system in the 12th working example of this invention fractured in part.

Drawing 29 is drawing of longitudinal section of drawing 28.

In drawing 28 and drawing 29, a projection arrangement, the screen supporting structure, etc. are omitted for the sake of the convenience which shows clearly the composition of the screen of the back projection type multiscreen display device by the system of this example.

[0154]As shown in drawing 28 and drawing 29, the display system of this example has the composition of having installed the imitation vehicle device 100 in the inside center section of the campanulate display device which used the back projection type multiscreen display device.

[0155]The lower 2 step of the back projection type multiscreen display device of this example is square screen shape (rectangle screen 1), and upper 3 step is trapezoid screen shape (trapezoid screens 11, 12, and 13) with a small base as the upper row. Therefore, whole shape is a hanging bell-shaped thing.

[0156]The back projection type multiscreen display device of this example, Since a sufficient luminosity and definition are securable by an angle of visibility be larger, and being able to provide the high image of presence, and considering it as a multiscreen system, since the perimeter image of 360 degrees of horizontal directions can be displayed, The image which exists also as a display system in a feeling of presence is acquired.

[0157 ]As mentioned above, although each working example illustrating this invention explained, the video source which used the liquid crystal etc. besides the projected type cathode-ray tube can be substituted for the video source which is used for a back projection display device in the range which does not deviate from the pneuma of this invention to a person skilled in the art to say nothing of various modification being possible.

[0158]

[Effect of the Invention]According to this invention, an angle of visibility is large securing a sufficient luminosity and definition, and a back projection type multiscreen display device with a high image of presence can be provided so that clearly from the above explanation. It becomes a structure possible [ a simple assembly ] and strong, and also a picture with little change of a color and contrast degradation can be provided. Therefore, according to this invention, a view \* \* person can be provided with the display system which can give high presence.

---

[Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\* shows the word which can not be translated.
3. In the drawing s, any words are not translated.

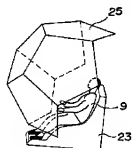
---

**DRAWINGS**

---

[ Drawing 10 ]

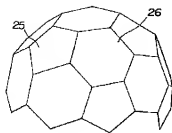
【図10】



- 9.....観察者  
23.....観察用座席  
25.....正5角形スクリーン

[ Drawing 12 ]

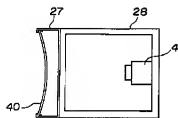
【図 12】



- 25・・・正5角形スクリーン  
26・・・正6角形スクリーン

[Drawing 16]

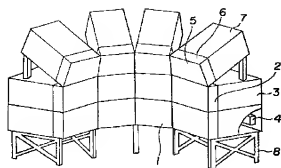
【図 16】



- 4・・・投写装置  
27・・・スクリーン支持枠  
28・・・ユニット支持枠  
40・・・囲壁スクリーン

[Drawing 11]

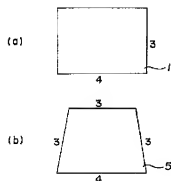
【図 1】



- 1...長方形スクリーン
- 2...スクリーン支持棒
- 3...ユニット支持棒
- 4...投写装置
- 5...台形スクリーン
- 6...台形スクリーン支持棒
- 7...ユニット支持棒
- 8...支滑台

[Drawing 2]

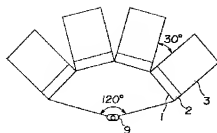
【図 2】



- 1...長方形スクリーン
- 5...台形スクリーン

[Drawing 3]

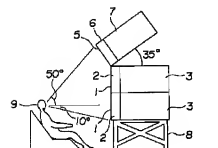
[図 3]



- 1... 長方形スクリーン
- 2... スクリーン支持棒
- 3... ユニット支持棒
- 4... 観客者

[Drawing 4]

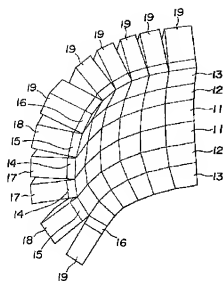
[図 4]



- 1... 長方形スクリーン
- 2... スクリーン支持棒
- 3... ユニット支持棒
- 5... 台形スクリーン
- 6... 台形スクリーン支持棒
- 7... ユニット支持棒
- 9... 観客者

[Drawing 5]

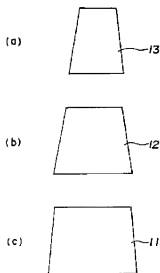
〔図 5〕



11, 12, 13...台形スクリーン  
14, 15, 16...台形スクリーン支持枠  
17, 18, 19...ユニット支持枠

〔Drawing 6〕

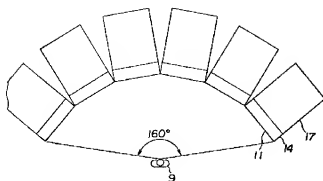
〔図 6〕



11, 12, 13...台形スクリーン

〔Drawing 7〕

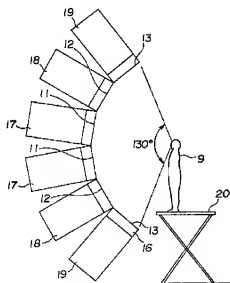
【図 7】



- 9.....観覧者  
 11....台形スクリーン  
 14....台形スクリーン支持棒  
 17....ニット支持棒

[Drawing 8]

【図 8】

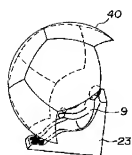


- 9.....観覧者  
 11, 12, 13....台形スクリーン  
 16.....台形スクリーン支持棒  
 17, 18, 19....ユニット支持棒  
 20.....観覧用床面

[Drawing 18]



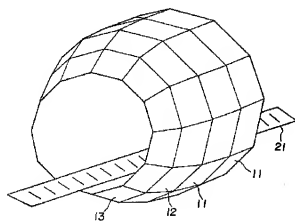
【図 1 6】



- 9・・・観覧者  
23・・・観覧用座席  
40・・・凹面スクリーン

[Drawing 9]

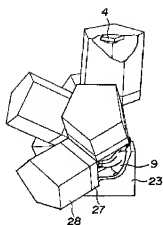
【図 9】



- 11, 12, 13・・・台座スクリーン  
21・・・観覧用遮扉

[Drawing 11]

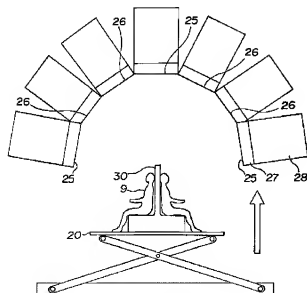
【図 11】



- 4・・・表示装置
- 9・・・観視窓
- 23・・・観視用座席
- 27・・・スクリーン支持棒
- 28・・・ユニット支持棒

[Drawing 13]

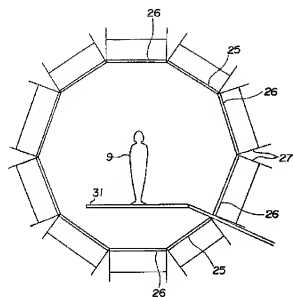
【図 13】



- 3・・・観視者
- 20・・・観視用床面
- 25・・・正六角形スクリーン
- 26・・・正六角形スクリーン
- 27・・・スクリーン支持棒
- 28・・・ユニット支持棒
- 30・・・観視用座席

[Drawing 14]

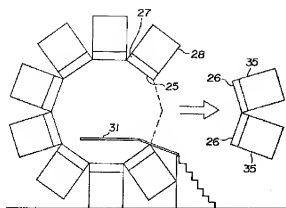
【図14】



- 9・・・観覧者
- 25・・・正5角形スクリーン
- 26・・・正6角形スクリーン
- 27・・・スクリーン支持枠
- 31・・・透明床面

[Drawing 15]

[図 15]



- 25・・・正5角形スクリーン
- 26・・・正6角形スクリーン
- 27・・・スクリーン支持棒
- 28・・・ユニット支持棒
- 31・・・透明床面
- 35・・・可動ユニット

[Drawing 17]

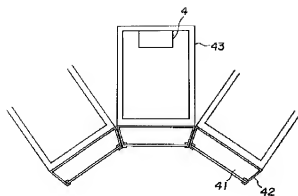
[図 17]



40・・・凹面スクリーン

[Drawing 19]

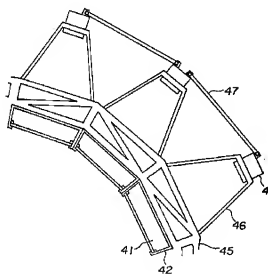
[ 図 1 9 ]



- 4.....投影装置
- 41....スクリーン
- 42....スクリーン支持棒
- 43....ユニット支持棒

[Drawing 20]

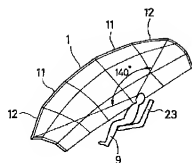
[ 図 2 0 ]



- 4.....投影装置
- 41....スクリーン
- 42....スクリーン支持棒
- 45....ユニット支持棒
- 46....投影装置支持棒
- 47....投影装置用の連結棒

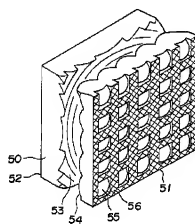
[Drawing 26]

【図 26】



[Drawing 21]

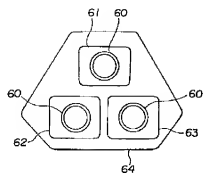
【図 21】



- 50.....フレネルレンズシート
- 51.....マイクロレンズシート
- 52, 54.....光入射面
- 53, 55.....光出射面
- 56.....光吸収層

[Drawing 22]

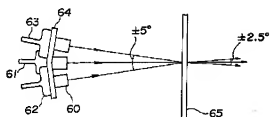
[図 22]



- 60...投写レンズ
- 61...G投写型ブラウン管
- 62...R投写型ブラウン管
- 63...B投写型ブラウン管
- 64...ブラケット

[Drawing 23]

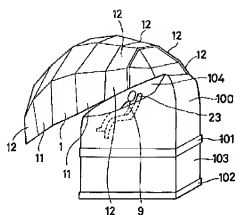
[図 23]



- 60...投写レンズ
- 61...G投写型ブラウン管
- 62...R投写型ブラウン管
- 63...B投写型ブラウン管
- 64...ブラケット
- 65...スクリーン

[Drawing 24]

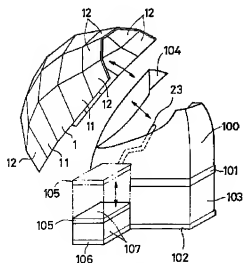
【図 24】



- 1…長方形スクリーン  
 9…観覧者  
 11、12…台形スクリーン  
 23…観覧用座席  
 100…観覧乗り物装置  
 101…モーションライド  
 102…固定ベース  
 103…動揺装置  
 104…出入口の扉

[Drawing 25]

【図 25】

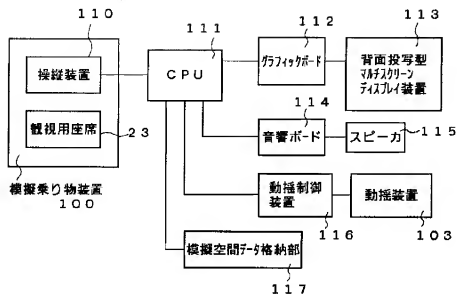


- 105…乗降ステップ  
 106…ステップベース  
 107…昇降装置



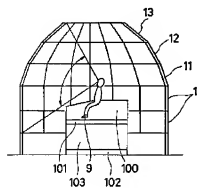
[Drawing 27]

【図 27】



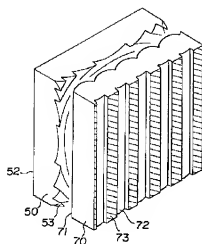
[Drawing 29]

【図 29】



[Drawing 32]

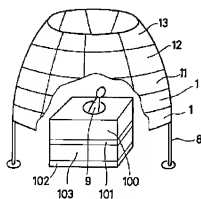
[図 32]



- 50.....フレネルレンズシート
- 52, 71...光入射面
- 53, 72...光出射面
- 70.....レンチキュラーレンズシート
- 73.....光吸収帯

[Drawing 28]

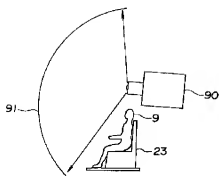
【図 28】



- 1...長方形スクリーン
- 8...支持台
- 9...観覧者
- 11, 12, 13...台形スクリーン
- 100...覆蓋兼り物装置
- 101...モーションライド
- 102...固定ベース
- 103...動揺装置

[Drawing 30]

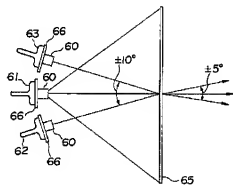
[図 30]



- 9.....観覧者
- 23.....観覧用座席
- 90.....フロント投影装置
- 91.....反射型スクリーン

[Drawing 31]

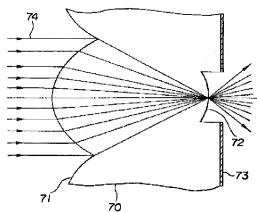
[図 31]



- 60....投影レンズ
- 61....Q柱型ブラウン管
- 62....R柱型ブラウン管
- 63....B柱型ブラウン管
- 65....スクリーン
- 66....ブラケット

[Drawing 33]

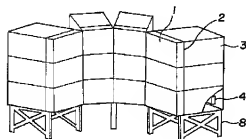
[図 33]



- 70...レンチキュラーレンズシート  
 71...光入射面  
 72...光出射面  
 73...光吸収部  
 74...入射光

[Drawing 34]

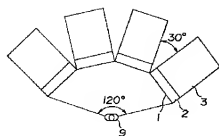
[図 34]



- 1...長方形スクリーン  
 2...スクリーン支持棒  
 3...ユニット支持棒  
 4...投写装置  
 8...支持台

[Drawing 35]

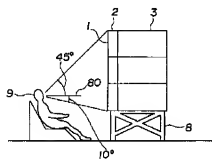
[図 35]



- 1...長方形スクリーン
- 2...スクリーン支持枠
- 3...ユニット支持枠
- 9...観視者

[Drawing 36]

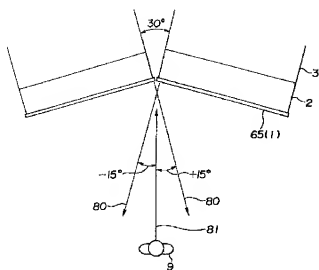
[図 36]



- 1...長方形スクリーン
- 2...スクリーン支持枠
- 3...ユニット支持枠
- 8...支持台
- 9...観視者

[Drawing 37]

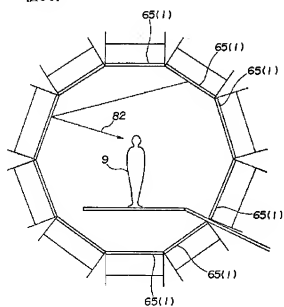
[図 37]



- 2.....スクリーン支持枠
- 3.....ユニット支持枠
- 9.....観覧者
- 65.....スクリーン
- 80.....スクリーン法線方向
- 81.....観覧角度

[Drawing 38]

[図 38]



- 9.....観覧者
- 65.....スクリーン
- 82.....反射光

---

[Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## EFFECT OF THE INVENTION

---

[ Effect of the Invention] According to this invention, an angle of visibility securing a sufficient luminosity and definition, and a back projection type multiscreen display device with a high image of presence can be provided so that clearly from the above explanation. It becomes a structure possible [ a simple assembly ] and strong, and also a picture with little change of a color and condensation can be provided. Therefore, according to this invention, a viewer person can be provided with the display system which can give high presence.

---

[ Translation done.]



\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**EXAMPLE**

---

[ Example] Hereafter, each working example illustrating the details of this explains.

---

[ Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## MEANS

---

[ Means for Solving the Problem] It has back projection type multiscreen composition which makes two or more back projection display devices adjoint obtains a big screen in this invention. The aforementioned purpose is attained by using a trapezoid, a polygon with angles of five or more angles, bowl-shaped three-dimensional curved surface shape or shape of a transmission type screen of a proper thing of each back projection display devices.

[ 0034] drawing 1 is a perspective view showing one example of composition of back projection type multiscreen display device of this invention. drawing 2 is one example of shape of each transmission type screen.

[ 0035] As shown drawing 1 and drawing 2 this invention is the composition of obtaining length and a screen which curved in horizontal both directions, by including not only the conventional rectangle but trapezoid shape in shape of a transmission type screen of a back projection display device. In order to obtain length and a screen which curved in horizontal both directions in this invention, Right 12th page body structure which uses structure of only a trapezoid transmission type screen, and a transmission type screen of a right pentagon in addition to the above-mentioned composition, or its part, 32nd page body structure (32nd page body structure which consists of the 12th page of a pentagon, and the 20th page of a right hexagon; what is called truncated piece) of a football form - - or - - the - - in said screen composition, three-dimensional curved surface shape is also further used by each transmission type screen itself in part.

[0036] In this invention, in order to raise presence of a picture further, a floor and composition which carries out view \* \* of the image over a passage are also taken by using transparent construction material for composition, a floor, and a passage which are made into a form which takes out and looks into an image below \* \* person's step. A view \* \* person's back and a lower part are used as of dome shape, and also by using a door of an entrance as a back projection display device, are hard to be visible in an entrance from a view \* \* person, cannot be made not visible at all, and composition which raises presence further is also taken.

[0037] In order to consider it as structure which can assemble simply a back projection type multi-screen display device with transmission type screen sheet, this invention, the screen side adopts as a screen back of each back projection display device multi-truncated pyramid shape (shape which cut off the head of a hollow multi-tapered cone) of hollow which becomes narrow, or, or a screen and a projection arrangement back are made into another structure, and structure which can assemble only a screen back first is taken.

[0038] Drawing 1 is a cross-sectional view of one example of a back projection type display device which uses multi-tapered frustum shape for a screen back. In the figure, the screen side is making narrow composition to the unit back 43 side the screen back 42 which supports the screen 41 has composition that an adjoining screen frame can contact in fields mutually.

[0039] Drawing 2 is a drawing of longitudinal section of one example of a back projection type display device which made a screen back and a projection arrangement back another structure. In the figure, a back projection display device, it consists of the projection arrangement back 46 supporting the screen back 42 which supports the screen 41, the unit back 45 supporting the screen back 42, the projection arrangement 4, and the projection arrangement 4, structure which the screen back 42 supports to the unit back 45 is made. An assembly object of the screen back 42 and the unit back 45 has composed becoming independent independently.

[0040] In the above-mentioned composition, when assembling a back projection type multi-screen display device, the unit back 45 is assembled first, the screen back 42 is attached to the unit back 45 after that, and, finally the projection arrangement 4 and the projection arrangement back 46 are constructed.

[0041] In order to raise image quality of a multiscreen display device of a dome shape in this invention, Arrangement of three projection lenses is made into structure arranged on each vertex of 2 equilateral triangle instead of in-line arrangement arranged in one conventional row wide three, or composition which uses conventional not a lenticular lens sheet but micro lens sheet for a transmission type screen is taken.

[0042] Drawing 22 is a front view showing one example of arrangement of a projection lens and a projected type cathode-ray tube in a case of having arranged three projection lenses on each vertex of 2 equilateral triangle. As shown in the figure, the projected type cathode-ray tube 61 of G is shifted to rectangular directions, and the projected type cathode-ray tubes 62 and 63 of R and B are considered as next to each other \* \* and 2 equilateral triangle arrangement. In this invention, when one body changes what was attached independently three conventionally about a bracket which connects a projected type cathode-ray tube and a projection lens, it is constituted also so that a weight saving may be attained.

[0043] Drawing 21 is a perspective view showing an important section of a transmission type screen. In the figure, a transmission type screen is two-sheet composition which consists of the micro lens sheet 51 and Fresnel lens sheet 50. The light incidence face 54 of the micro-lens sheet 51 is making shape where followed a picture horizontal direction and a screen perpendicular direction, and a micro-lens element of a convex was arranged in the Fresnel lens sheet side. Furthermore, the light emitting surface 55 is making shape where followed a picture horizontal direction and a screen perpendicular direction, and a micro-lens element of a convex was arranged in the view \* \* side. And a flat-surface part of the shape of a lattice projected more highly than a lens is provided in a boundary part between micro-lens elements of the light emitting surface 55, and the lattice-like light absorption band 56 is formed on it. An area ratio of this light absorption band is 7.5 % of the area of a light emitting surface of a micro lens sheet.

---

[Translation done.]

\* NOTICES \*

**JPO and INPIT are not responsible for any damages caused by the use of this translation.**



1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## OPERATION

---

[Function] In this invention, as a result of examining the angle of visibility projection type multiscreen display, the mainly following facts were found. Therefore, it is originated.

[0045] In order for a viewer \*\* person to get the presence which can be also an image, I think that about 50 degrees of pictures which can cover the angle of visibility of about 120 degrees horizontally are perpendicularly required. In the multiscreen display of the conventional  at surface, in order to cover this angle of visibility, when a viewer \*\* person is 1.5 m away from a screen, about 70 inch and a big screen about 200 inches wide are needed. Also in the case where the above-mentioned big screen is constituted, since a viewer \*\* person's degree of viewing angle to a screen method line will be about 65 degrees, distortion of picture seen from the viewer \*\* person is intense, and it is hard coming to carry a viewer \*\* in the screen of an end. When the degree of viewing angle to a method line is large, image heights do not  y in the direction in which a viewer \*\* person is located, but the luminosity of appearance falls victim.

[0046] Therefore, as for the screen of right and left ends, and the screen of upper and lower ends, in the screen composition which covers the aforementioned angle of visibility, it is desirable for at least 30 degrees to incline to a viewer \*\* person.

[0047] In this invention, a transmission type screen with shape other than the transmission type screen of the conventional rectangle is used.

Therefore, since the screen of right and left ends and the screen of the upper

and lower ends can be freely leaned to the view \*\* person side, an angle of visibility can be extended in the area of fewer screens.

Since it is possible to lean a screen method line to the view \*\* person side, there is little distortion of the picture of appearance and a bright picture can be provided. [0048]According to this invention, since it is [ image ] extensible also to down [ of a perimeter enclosure and also a view \*\* person ], also when a view \*\* person moves the head or it takes advantage, the break of a picture is lost and it also becomes possible easily to raise presence further.

[0049]When the projection arrangement of a method with the projection lens of 2 equilateral triangle arrangement is adopted, since the angles of convergence of the projection lens of R and B of a picture horizontal direction can decrease to conventional 50% with \*\*10 to [ conventional ] \*\*5 degrees, A color shift can also be reduced to conventional 50%, and the phenomenon in which the colors of the picture between each back projection display device differ can be eased. However since the projection lens was conventionally located in a line with one row at this time, a color shift is not generated in a screen perpendicular direction, but in 2 equilateral triangle arrangement by this invention, \*\*4 degrees of angles of convergence occur perpendicularly. However, since the absolute value of angles of convergence becomes to the former below in half, change of a color is no longer a size which poses a problem.

[0050]Since it is able for the light absorption band of a light emitting surface to consist lattice- like of a pattern of the conventional pinstripes, and to raise an area ratio to about 150% of the conventional lenticular lens sheets by using a micro lens sheet for a transmission type screen, Reduction of surface reflection of the image lights which enter from other screens is attained, and it can provide 50% of the conventional lenticular lenses with the good image of contrast.

[0051]In order to be able to aim at reduction of the weight of a projection arrangement by unifying the bracket of three projection lenses of a projection arrangement again and also to make the buck of a screen into what can become independent alone, Even when the weight saving of the buck of a projection arrangement is carried out, intensity becomes enough, and the whole weight saving of it becomes possible, and it can be made into the structure which can be assembled easily.

[0052]The back projection type multiscreen display device by this invention

explained above, By using for the graphic display of display systems, such as training devices, such as a game device of an amusement park, a driving simulator, and a flight simulator. Since an image with a larger angle of visibility is acquired and more powerful presence can be given by this, those who do view \* ' can be provided with the false space which gives feeling which enters into an image - - a feeling of presence - - producing a certain consciousness - - the quality of play, or training of training - - a degree can be raised.

---

[ Translation done. ]